School Shop

vol. XIX no. 5

JANUARY 1960

A Course of Study Gives Direction
by Richard P. Hamilton

Try Simplified Drafting
by James E. Seitz

File Trays
by Arthur E. Petersen

Cover Story: John Cooney (left), drafting instructor at Edgewood, Md., High School, offering a suggestion to a student. To learn about a less formal kind of drafting, and a type used quite widely in industry, turn to page 10.

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Let's Get Together

This spring will see another season of convention conflicts with several state associations and one national organization holding their meetings on the same dates. The period from April 19 to 23 is filled with meetings.

The American Industrial Arts Association will convene in Toronto. During this same period the Michigan Industrial Education Society will meet in Lansing and the New York Vocational and Practical Arts Association will get together in Schenectady. There may be other state conventions planning sessions for the same popular period that have not announced their dates as yet.

Such overlapping of convention dates creates problems for convention goers, exhibitors, and the organizations themselves. The professionally minded industrial-education man in Rochester, N.Y., or Detroit, Mich., is torn between attending his state or the national meeting. Most conventions rely heavily on commercial exhibits to finance their activities. Many exhibitors do not have the manpower to cover three conventions adequately at the same time. Some are able to attend but one at a time. Obviously, the exhibitors will be unhappy and convention revenue for the association will be reduced.

The associations holding conflicting meetings will be limited in the professional talent they can attract for their programs because potential speakers and participants will be committed for other meetings.

Obviously, some sort of clearing house for convention dates is needed to avoid the perennial problem of conflicts. As it now stands, each association goes ahead on its own with plans, only to find out too late that the dates they are committed for have been chosen by several other groups.

In baseball the American League and the National League turn over their scheduling to one man who sets the dates and the two leagues agree to abide by his decision. We need the same kind of arrangement for industrial-education associations. Our nominee for this job is some member of the staff of the American Vocational Association, the National Education Association, or the U. S. Office of Education who is mutually agreeable to the various professional organizations. The job would not be onerous and the service performed would be most helpful.—*L.W.P.*

Instructional Materials on the Way

Early last year a conference was held at the U. S. Office of Education in an attempt to develop some cooperative action for instructional materials development in trade-and-industrial education. A fair amount of activity in this field has been going on around the country for some time, more or less on a hit-or-miss basis. Curriculum materials, textbooks, workbooks, visual aids, courses of study, and like items were being produced hither and yon with much duplication of effort and little coordination.

Already the Trade and Industrial Education Branch of the USOE can point to some excellent results. A full-time vocational curriculum materials specialist is on the job and various programs are under way to develop curriculum leadership, coordinate the work of various specialists throughout the country who are working on instructional materials, and publish lists of these materials which are available throughout the nation.

Much more cooperative effort is still needed to get these materials into the hands of the instructors who are the ones to put them to good use. The wealth of material and the excellence of much of it have been lost sight of because of this lack of coordination. The situation now, though, is changing rapidly.

The Trade and Industrial Education Branch is to be complimented on its activities in this area. There is no disposition to dictate from Washington, but rather a genuine effort to unlock the instructional resources already available and help state and local groups validate and update them.—*L.W.P.*

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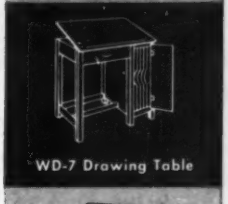
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IN THE MORNING MAIL...

(Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Dear Sir:

"Roll a Stencil" in your "Kinks" column (Nov. 1959) has paid dividends already. We had to roll out some large signs on the walls. We used rubber base paint instead of enamel. Our thanks to Mr. Mesner of Hagerstown, Md., for his suggestion.

G. A. Theiss,
Wells High School,
Chicago, Ill.

Dear Sir:

Your editorial "The Dumping Ground" in the November issue of SCHOOL SHOP brought these thoughts to mind and I would like to pass them on:

So much of the time we hear the gripers say what a raw deal they are getting from the office. They complain that their department has become the dumping ground for the stupid pupils in the school. I have come to believe that this is mostly a one-sided affair on the part of the shop teacher himself.

Does he send his "problem kids" to the principal for each wrong doing, or does he try to straighten the lad out in class on his own hook. . . .

Instead of bothering a "middle man" like the principal, I have found it very effective to get on the phone and call the parents direct and give them the problem first hand. You will be surprised how much cooperation you can get. Another important point for consideration—don't wait until the lad does something bad. Take time to call his parents and tell them how much you enjoy the lad in class, the kind of work he is doing, etc. It will pay dividends. It has for me. Arrange conferences on your own ground at school, however . . .

Donald F. Kinnaman,
Camelback High School,
Phoenix, Ariz.

Dear Sir:

After reading over the October issue of SCHOOL SHOP, I wish to compliment you on the excellent layout and design of this issue. . . .

A. M. "Bert" Fellows,
Director of Printing,
California State Polytechnic College,
San Luis Obispo, Calif.

Dear Sir:

For some time I have been wanting to drop you a line with a suggestion which I think might merit some consideration.

I am often amused with the cartoons in the issues of SCHOOL SHOP. More important, I can often see some educational value that might be derived from them by my students—if I were willing to cut up my copy of the magazine. So that our students might be able to share with us these cartoons, why not print them on a separate sheet so they might be displayed in the shop? I think this service would certainly be approved by other industrial-arts teachers and be a real help to them.

Richard H. Snow,
Tonalea Elementary School,
Scottsdale, Ariz.

(*Editor's Note*: Comments are invited.)

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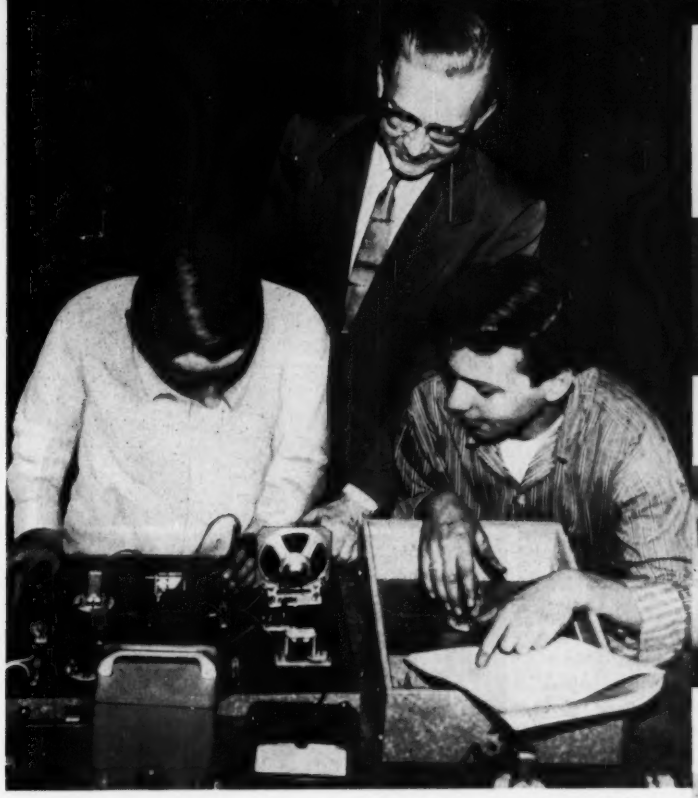

Mr. Stanley Gardner, electronics instructor at Newton Technical High School, Newton, Mass., whose statement appears above, is shown observing two students who are constructing a circuit from an EIA Manual.

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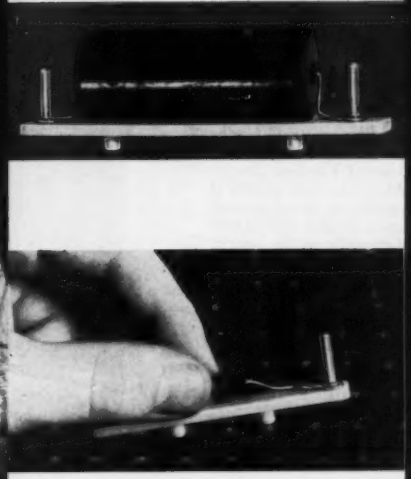

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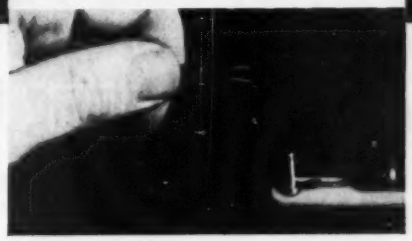

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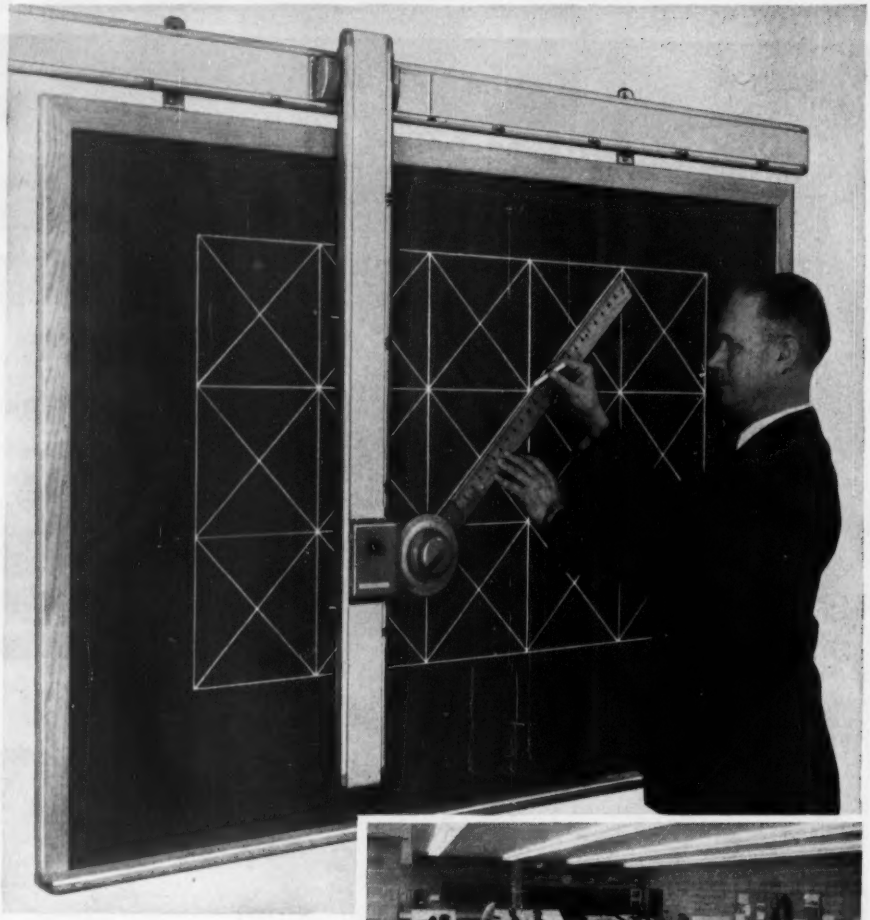

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POST

Students – like drivers – get confused unless

A Course of Study Gives Direction

By Richard P. Hamilton

Director, Division of Practical Arts Education, New Castle - Henry Township School Corporation, New Castle, Indiana

MODERN education, in the scientific culture of America, is faced with a challenge that is providing the force necessary to swing the pendulum of education from the "progressive" era of the recent past to the era of "measured achievement" which we are entering. Demands are being made for the so-called "frill" courses to either make their contribution to education more meaningful and tangible or fall by the wayside. Every curriculum is being examined closely by the public to see how it contributes to the educational growth of students.

Industrial-arts courses are not "frill" courses and have been accepted as an integral part of general education. In too many instances, however, we find our hands are not as clean as they ought to be. The post-war years have found many industrial-arts classes operated in a laissez-faire manner with very little leadership on the part of the teacher. In many cases the teacher does not even have a course of study to guide the class, or, if he has one, it is neatly tucked away in a file and remembered only in the back of his mind. Too much of what is to be learned is left up to the students with the result that we have little assurance that they have learned much of anything.

Aids Direction

An automobile without a steering wheel would be useless. Likewise, traffic without system would lose direction. And so it is with industrial arts: A class without a course of study or a plan to follow that is functional and put to use cannot hope to hold its place in education. It then becomes meaningless and merits the classification of "frill." This all points out the need for something by which we may proceed, something to give us direction and assurance of accomplishment. This is the role which rightfully belongs to a course of study. Industrial-arts teachers realize the need but in a great number of cases they do not know how to go about making a plan to follow. They can make plan sheets but not course plans. Much has been written concerning the methodology of course construction but a large amount of it deals with generalities and is provided by ambiguous terminology. Just as there is more than one way to park a car, so is there more than one method of course construction. The following method is tried and proven. It may be found helpful to a teacher with a planning problem.

1. Determine the objectives of the course. Why is the course offered? How can the course contribute in a measurable way to the educational growth of those who take it? Objectives must be realistic and attainable and in harmony with the general objectives of industrial arts. Too often objectives are listed which would be impossible for a given teacher to attain in a given situation. Objectives must be tailor-made.

2. Make an analysis of the subject area for both manipulative skills and related content. Include only those manipulative skills that schools can and should teach in the given grade or progress level. The related content should be closely associated with the skills to be taught and the industrial area concerned.

3. Arrange the selected manipulative skills on some determined basis. It is generally agreed that the skills may be handled better if arranged sequentially (the most used skill or operation listed first, etc.).

4. Select or design vehicles through which to teach the skills. Beginning vehicles or projects should be simple, requiring few periods for satisfactory completion. Successive projects should build on previously gained skills and information and should involve more and higher degree skills. Vehicles should be meaningful and have a functional use although in some cases the vehicle may have to be of the "exercise" type.

Groups of three or more projects requiring the same general processes and operations should be compiled in core units. Each project should represent a different student interest. From each core unit the student may be allowed to select the project which makes the strongest appeal to him.

(Continued on page 28)

To keep abreast of industry

Try Simplified Drafting

By James E. Seitz

Lecturer in Mechanical Design Technology, Temple University Technical Institute, Philadelphia, Pa.

SHORT-CUT drafting methods are being proposed and adopted which require partial and sometimes complete rejection of traditional graphic techniques. Until recently only gradual innovations occurred. Standardizing agencies set the pattern and the schools taught in that light. Now there is pressure to abandon time-honored practices for more economical methods.

The bigger manufacturing concerns are largely responsible for this. This is understandable because any economy of method is far more significant and more likely to occur where the total drafting enterprise represents the greatest capital outlay. Then, too, large organizations for various reasons are in better position to evolve, experiment, implement, and receive recognition for new practices. Small companies, on the other hand, must generally utilize accepted drafting methods as they are seldom in a position to undertake a program of retraining employes.

What is the role of the professional educator in this respect? All of industry wants his leadership, but he remains dilatory. Industry claims it is either dependent on the school entirely or it is unnecessarily being burdened with training programs to re-educate graduates, yet the educator has made no concerted effort to provide leadership by revising traditional drafting courses. That he must avoid cursory action is true. However, when we judge by the increasing number of companies publishing new standards for their employes to follow, the time for positive action seems overdue.

The danger at this time appears to be not so much in making changes but in the unwillingness to do so. Until, of course, standardizing agencies publish clarifying rules, the educator must proceed with caution. There is no intent to imply differently.

The New Practice

The current, revolutionary techniques employed in drafting practice are most commonly called "simplified drafting." When this term is used hereinafter it is intended to mean that form of the descriptive language reduced to lowest or simplest form. It is not to be confused with standardization or conventionalization, as, for example, in the representation of screw threads to ASA recommendations. Reference to the illustrations should make this clear.

Credit for simplified drafting must go to industry. Several factors inherent in industrial production and expansion schedules are the chief causes: First, there is the ever-present need to cut production costs; second, the recent shortage of qualified draftsmen to handle increased volume; third, the need for time-saving methods to meet immediate production schedules; and, fourth, the need for more time and manpower to devote to research.

If individual credit is to be given for providing initial impetus to simplified methods, much must go to Healy and Rau as an outgrowth of their program at General Electric. Since 1953, when their book[1] came from the press, national attention has focused on the subject and other companies have improvised similar programs with apparent success. Seeing the need for some guide, several national associations are working to standardize procedures.

Although this tends to indicate that the practice will remain in use, it does not mean that simplified methods have been completely accepted. On the contrary, at the outset the topic was subject to much debate.

One major point of criticism has been that quickly made drawings in the hands of the shopman tend to cause careless work. This argument may be psychologically sound. In practice, though, there is not as much likelihood of the shopman producing inferior work as is at first apparent because he is bound by the same limits of precision on the product whether a simplified or a traditional drawing is used. It may be observed that, to pass inspection, the plate in Fig. 1 could not be produced from one drawing any less precise than from the other. The controlling tolerance is understood to be the same in each case. Furthermore, it is questionable if there would be fewer acceptable parts produced in a given specified time from one than from the other.

The foregoing is admittedly an oversimplification for the purpose of illustration, but the contention remains strong as before that workmanship is controlled by the limits of precision specified rather than by the type of drawing. The influence of such things as fatigue, illness, lighting, color scheme, and relaxation periods probably has more effect too.

While it is not the purpose here to present a detailed account of all the arguments pro and con, it is rather interesting to note that the debaters have recalled some clichés and adages familiar to draftsmen long before simplified methods came into being. "Cannon-balling," "one dollar on the board is ten saved in the shop," and "an extra line is a waste of time" were among them and it is not difficult to see which side used each. Today in most of the literature, the critics are silent. Practically anything written is by the proponents who are experiencing success with the method.

It does appear now that simplified methods are here to stay. One thing is certain: if a given industry can continue to show savings of from 40 to 50 percent of the total drafting time as one company[2] has indicated, more are going to adopt the techniques. Future dissemination and promulgation through textbooks, periodicals, and regulatory agencies will also tend to cause wider adoption and it may well be that as its merits become fully realized, simpli-

[1] H. W. Healy and A. H. Rau, *Simplified Drafting Practice: A Modern Approach to Industrial Drafting.* New York: John Wiley & Sons, Inc., 1953.

[2] J. H. Berger, *Simplified Drafting.* New York: American Machine and Foundry Co.

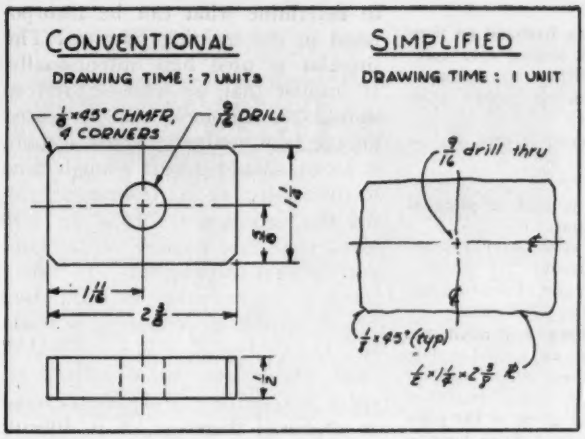


Fig. 1—Comparison of conventional and freehand simplified drawings. Symmetry and function often permit use of centerline symbol.

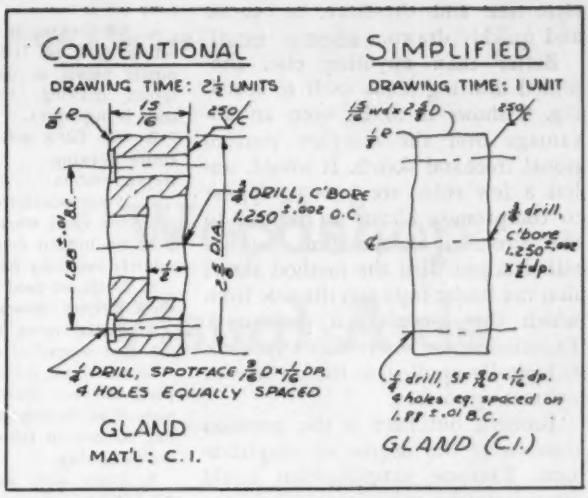


Fig. 2—Comparison of two sketches. The arrowheads in the simplified version (right) are used to show the direction of the operation.

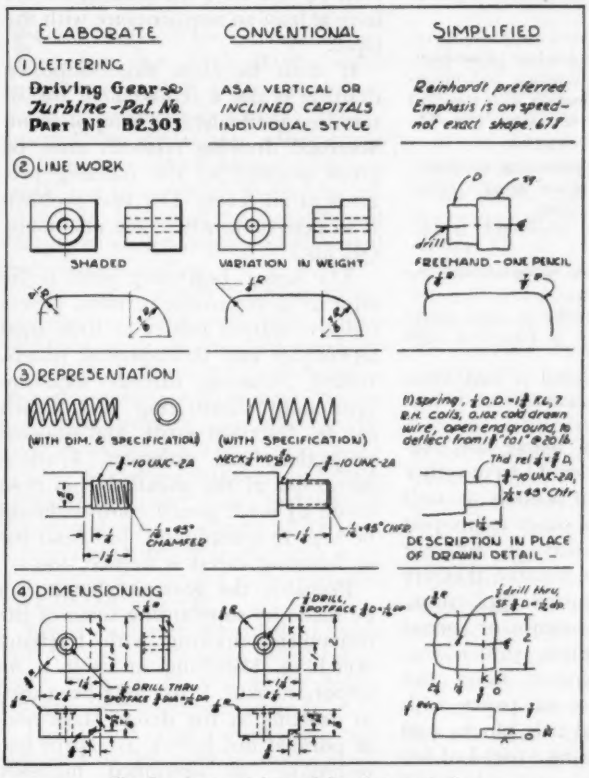


Fig. 3—A comparison of drawing methods.

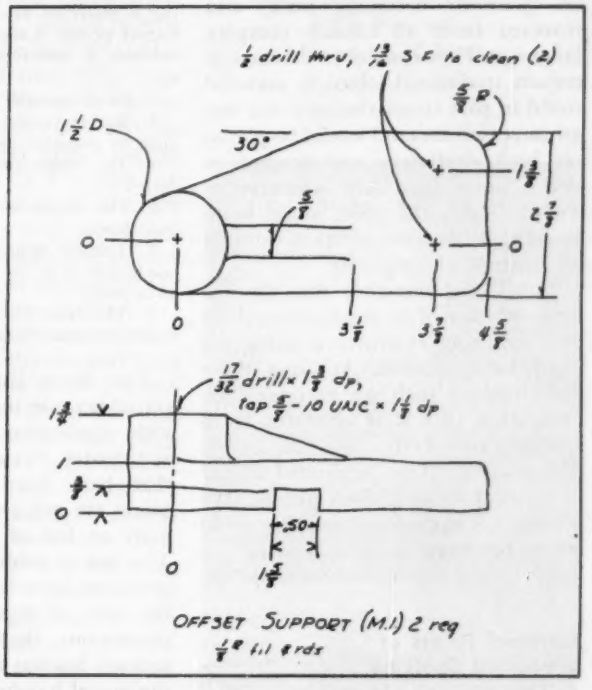


Fig. 4—Application of reference-line dimensioning to an unsymmetrical casting.

fied drawing will be used for the bulk of the work now done by standard methods. Of course, this is by way of speculation.

Regardless of how extensively new methods are received, conventional drawing will never be entirely replaced because there will always be need for several types or levels. This is best illustrated by the familiar comparison of drafting to letter writing. The very formal announcement, the formal business letter, and the informal personal letter have their respective counterparts in drafting as the procurement, patent, or presentation drawing, the standard drawing used between companies or plants, and the simplified drawing for rush jobs or prototype work within a plant. To define the limits of each level any more exactly is difficult.

Simplified Methods

As stated before, the primary purpose of simplified drafting is to save time and thereby reduce costs. To accomplish this, freehand representation is characteristically employed and such features as arrowheads, hidden detail, and cross-hatching are sometimes omitted. Since all elements are executed as quickly as practical, the drawing lacks the beauty or artistry of conventionally drawn objects. Nonetheless, simplification is not license for careless drawing.

For any drafting system to merit acceptance it must meet industry's demand for speed and accuracy. Accuracy requires that drawings be clear, complete, and permit the precision in manufacture as intended. Speed is also important. It requires that drawings be on time or econo-

mize time and, therefore, be concise and quickly drawn.

Better than anything else, simplified drafting lends itself to speed. Fig. 2 shows it to be even an advantage over the one-view conventional freehand sketch. It would, unless a few rules are known, appear to compromise clarity in respect to the direction of operation, but familiarization with the method shows that the leader indicates the side from which the operation is performed. Experience also shows that a spotface is logically applied to the air-side or nonmating surface.

Brought out here is the question concerning the degree of simplification. Extreme simplification could necessitate the use of numerous new symbols and rules. This would require additions to publications that are presently becoming bulky and involved from an already complex language. The removal or deletion of certain traditional, obsolete material could in part counterbalance this but an increased demand would be placed on both draftsman and trainee to digest more facts and information. Paradoxically, the effect would be to make drafting more complex through an attempt at simplicity.

It is likely, therefore, that the features which will be retained are those not requiring extensive training for their interpretation. At times there has resulted such an extreme simplification that it is doubtful if in the long run there is any real saving. However, we must be careful in our analysis to remain open-minded. We should not exclude a code that could be as beneficial as the schematic has been to the piping industry, for example.

Cardinal Points of Simplified Drafting

The cardinal points of simplified drafting may be given as rapid lettering, freehand line work, practical representation, and functional dimensioning. The elaboration which follows is not necessarily indicative of the practice in any one place but rather it attempts to represent those features most likely to be retained. Some are illustrated in Fig. 3.

Lettering:

1. Reinhardt style is preferred because it lends itself to speed in execution and reading.
2. Extensive use of recognized abbreviations. No period is placed after the abbreviation unless it forms a word.

Examples: patent—pat.; round—rd; copper—cop.

Line work:

1. All drawing is done freehand on nonactinic grid, on vellum secured over coordinate paper, or on vellum by tracing a layout drawing. Proportion rather than scale is important.
2. One fairly soft pencil is used for an entire drawing.

Representation:

1. Word description is used in place of projected views where practical.
2. No hidden detail is shown unless absolutely necessary for clarity.
3. Notes are used in place of drawn holes, slots, grooves, bosses, etc.
4. Partial views, sections, and auxiliaries are used instead of complete projections.
5. Fasteners, springs, and other standard parts are not drawn in either details or assemblies. Description is given in the parts list. Balloon or tabular note shows location on assemblies.
6. Notes such as "typical," "same as," "ditto," etc., are used to indicate repeated detail.

Dimensioning:

1. Ordinate or reference-line dimensioning is preferred where function and manufacture permit. A combination with standard methods is sometimes necessary. (See Fig. 4.)
2. Unidirectional dimensioning is used.
3. Size description is given in note, rather than by projected dimensions.
4. The single-stroke arrowhead is preferred.
5. The origins of radii when obvious are not shown.
6. Tabular dimensioning is used where applicable as in the case of numerous holes on a part.
7. The centerline symbol is used where symmetry, manufacture, and function permit.

The items listed above are suggested because they could have rather wide application in schools as well as industry. Various other techniques that have been used at different places are not given because they are more or less of limited application. The use of rubber stamps or special templates for tolerances, symbols, etc., the use of typewritten notes and dimensions, the use of paper with printed borders and title blocks, and the use of handwriting instead of lettering are several examples. Some of these things are impractical or unfeasible in school work.

The Place in Education

It is one thing to talk about the placed of simplified drafting in industry but it is quite another to say just what the schools should do about it. Little has been done in the schools to date. Thus, there is no set pattern for others to follow. Because this is so, much that follows is by way of proposal and should be so regarded.

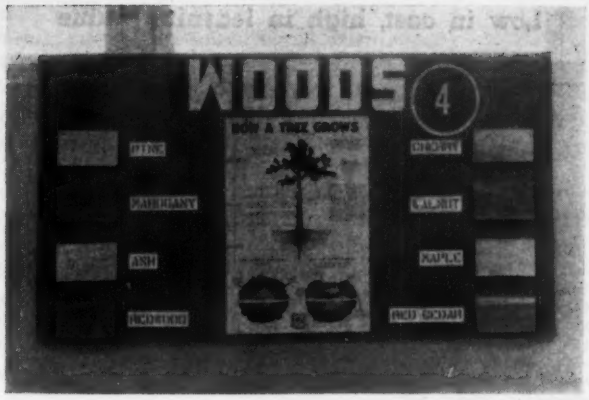
Proceeding on the premise that simplified drafting is important, it becomes the problem in each school to determine what can be incorporated in the training program. The singular is used here intentionally. It implies that, as schools vary, so should the emphasis that is placed on the new methods. Trade schools, it seems, should devote enough time to the subject so the trainee can utilize the technique skillfully. In technical institutes, engineering schools, and colleges training teachers, where there is no intention to train completely qualified draftsmen, a working knowledge should be provided. High schools vary considerably in respect to objectives and time devoted to drafting; therefore, it is difficult to make a broad recommendation in this respect. It appears, however, that even on this level the student should have at least an acquaintance with the topic.

It must be clear that simplified drafting is not a replacement for all standard methods; it is a supplement. Standard drawing methods must be given priority in the training program at all levels. The real problem is to determine where the new material fits.

The logical beginning point is the same as in any course revision. Delete obsolete subject matter or little used techniques and de-emphasize others. Inking, drawing threads semi-conventionally, illustrating parts which can be described easily, and unusual projections are examples. Furthermore, use of the so-called "practice" sheets to teach pencil control should be kept to a minimum. Judicious use of lettering sheets is needed, too.

Probably the greatest change can be made by supplanting some of the instrument drawing with freehand sketching. Sketching in itself is an important skill. It has long been used in drafting at the design stage and, as pointed out before, is a principal technique in simplified methods. Moreover, it is likely that many aspects of ordinary projection and dimensioning can be practiced as well freehand and, possibly, in less time than by using instruments.

Exactly how to incorporate new methods in the drafting course is a matter of individual cases. It is firmly believed, on final analysis, that one or two weeks can be saved for new material in many instances without risking superficiality. In any case, there must be continual effort to keep the training program abreast industrial practice. This may sound trite. Nonetheless, it does bear repetition. ★



More effective than words

Woodshop Visual Aids

By Robert L. Trathen

Head, Industrial-Arts Department,
Encina High School,
Sacramento, Califorina

FOLLOWING several years of lecturing, and using chiefly audio methods to explain techniques to students in woodshop classes, I have learned that visual aids, which could be brought to the students' attention while the instructor is giving the explanation, improved the quantity and quality of student work and increased their understanding.

The visual aids I have used successfully are simply made with a piece of Masonite as backing and wood for the objects themselves. A surplus stencil-cutting machine was used to make the lettering, but this can be done in several other ways. A finishing coat of lacquer was brushed on lightly to keep the chart clean and usable for several years. On some of the aids a poster was used to further illustrate a phase of the project or to broaden background material.

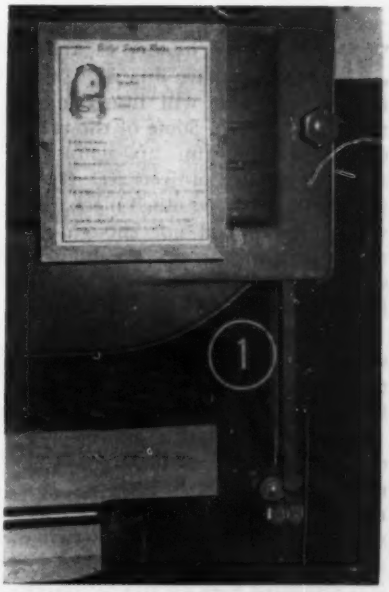
Visual aids were also used to teach safety. I placed a framed list of safety rules on each of the power-driven woodworking machines (Fig. 1).

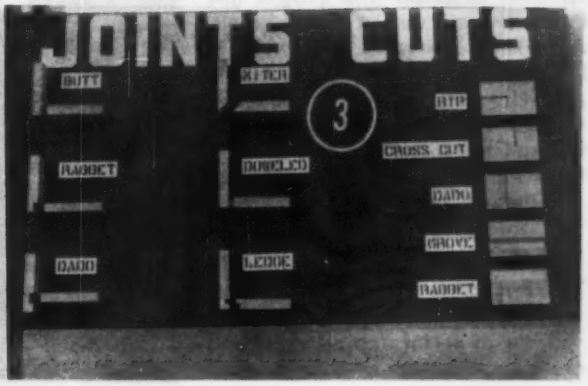
The visual aids shown here are examples of the types of charts used. *Woodturning* (Fig. 2) shows how to prepare the stock and the different cuts that can be made on a wood lathe. Included is a picture giving the name of the tools and the lathe.

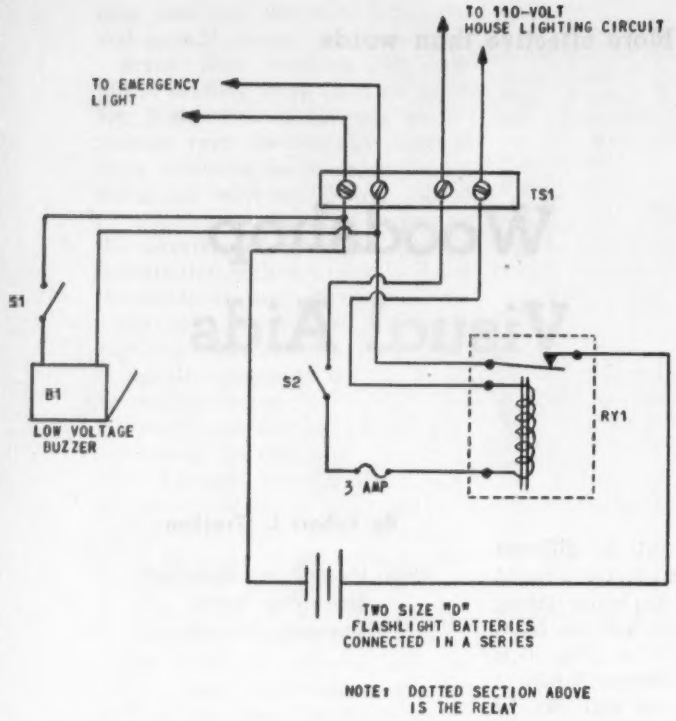
Wood Joints and Cuts (Fig. 3) is a chart showing different kinds of wood joints and cuts that can be made in wood and their correct names. *Woods* (Fig. 4) is a chart displaying actual samples of different types of woods and a diagram of how a tree grows. The woods selected for the chart are the types most generally used in this particular woodshop.

Other visual aids I have used show how to construct a drawer and how to build some of the basic projects made in class, which the students can refer to as they construct their projects, often saving time for the instructor and pupil.

Students enjoy looking at these visual aids. As I stated before, they seem to get a lot of good from them. Many students have volunteered to help construct more visual aids for the classes, which is a definite indication that the time, effort, and few supplies used in making the charts have been worthwhile. ★







Low in cost, high in learning value

Slave Unit Reports Power Failures by Light and Sound

By Robert J. Mouser

South Union High School, Uniontown, Pennsylvania

MOST electricity-shop teachers find they have difficulty selecting projects that will illustrate the theory they teach. Some of the major difficulties they run up against in selecting suitable projects are: (1) the project requires too much mechanical skill to make and not enough electrical work or theory; (2) shops are set up for electricity work and not for making other types of projects; (3) material costs run too high; (4) student interest is too low; (5) more time is spent on construction than learning electricity or theory.

We have developed a project—an emergency slave unit—that we feel meets the needs of our students and that can be made in our electricity shop. Several shop teachers in our area have been impressed with it and it is presented here for you to consider for your program. The project has the following features: (1) it is simple to make; (2) student interest in it has been high; (3) it teaches relays, parallel wiring, circuits, parts, basic wiring, batteries and low-voltage wiring, and low-voltage drop; (4) it can be used.

Fathers of our students have been very interested in the project and welcome it into their homes.

The Project

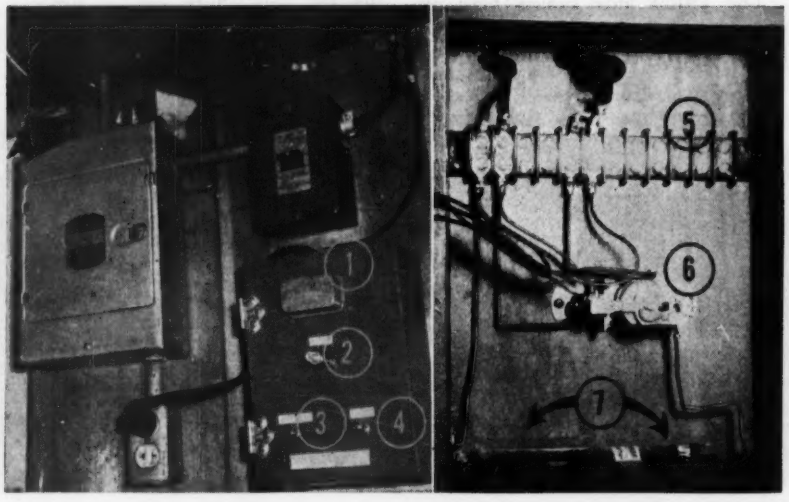
The slave unit is designed to help you out of a jam that all of us find ourselves in at one time or another: power failure. The slave unit will turn on an emergency light over your fuse box the instant a fuse blows or a circuit breaker opens. The slave unit will also signal you if there is a general power failure. The cost of this service is forty cents per year for maintenance and $5 to construct.

Construction

The heart of the "slave" is a single-pole, single-throw relay with a 110-v coil. This coil must be energized at all times to keep its contacts open. This prevents the emergency light and buzzer from functioning. The schematic drawing shows the main switch, S2, to be open so the relay contacts allow battery power to flow to the emergency light. The buzzer, however, does not have power entering it because its switch, S1, is open.

If you do not want an audio-type warning, the buzzer part of the circuit can be eliminated, but this would cut down the efficiency of the unit. It would signal power failure only by

The photos below show (left): The emergency slave unit mounted on a main electricity panel and (right) the interior of the slave unit. The numbers (1 through 7) show the following components: (1) the buzzer; (2) fuse holder; (3) buzzer switch; (4) main switch; (5) terminal strip; (6) the relay; (7) two flashlight batteries set in place. In the upper left-hand corner of the photograph at left, an arrow points to the emergency light.



means of the light. Opening switch S1 would cut out the sound signal when it isn't needed.

Parts selection is not critical because the relay is the only unit that must meet required specifications. Most of the other parts can be salvaged items. The wiring, with one exception, is simple (see schematic drawing). The exception is the wiring to the emergency-light fixture. It should not exceed 5' in length because the voltage will drop if it is longer. This would result in a dimmer warning light.

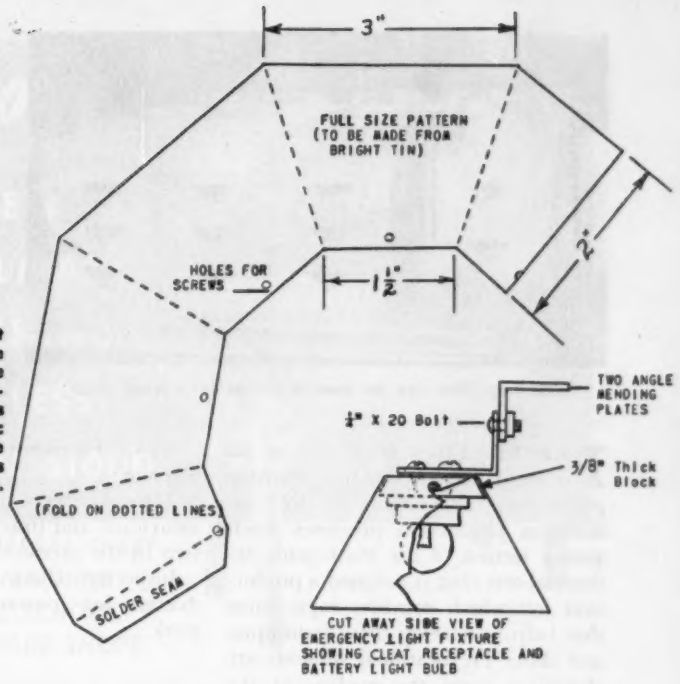
Control Cabinet

The cabinet is very simple to construct. All of the joints are simple butts. The stock is 2½" softwood, which is easy to work. The door is held shut with one wood screw.

Testing

The unit can be tested by pulling or opening the main house switch or opening the main switch on the slave control cabinet. The relay should close the contacts and the emergency light should be turned on. The buzzer should sound. Turn the buzzer off by opening its switch. The emergency light should continue to burn. Now turn the main switch back on. You should hear the relay click and the emergency light will be extinguished. Make sure, however, to turn the buzzer back on.

The drawing at right shows details of the emergency light. The drawing on the preceding page shows the wiring schematic of the slave unit. The drawing below shows the box and its parts.


3"
FULL SIZE PATTERN (TO BE MADE FROM BRIGHT TIN)
HOLES FOR SCREWS
1½"
2"
(FOLD ON DOTTED LINES)
SOLDER SEAM
TWO ANGLE MENDING PLATES
¼" X 20 Bolt
3/8" Thick Block
CUT AWAY SIDE VIEW OF EMERGENCY LIGHT FIXTURE SHOWING CLEAT RECEPTACLE AND BATTERY LIGHT BULB

EMERGENCY LIGHT SLAVE UNIT

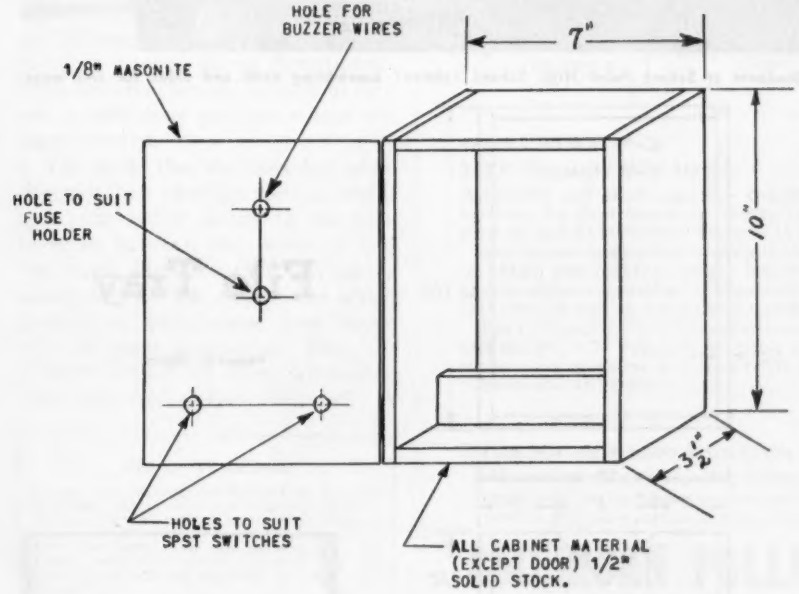
(FIXTURE)

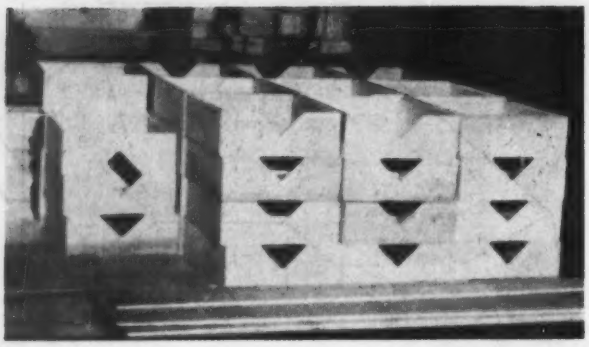
Maintenance

The unit should be tested at least once a year by opening the main house switch or opening the main switch on the slave-unit control cabinet. The batteries should be replaced once a year even if they show no sign of deterioration. Since batteries cost only forty cents it is cheap insurance so that you will not have to grope in the dark to change fuses and also you will be alerted when the power goes off.

Bill of Materials

TS1	Tie strip, four terminal
B1	Buzzer, low voltage
S1,S2	Switch, SPST (Cutler Hammer type 8280-16 or equivalent)
RY1	Relay, 110-v coil (advance No. GHA/1C/115 va)
1	Receptacle, miniature base porcelain cleat
1	Lamp, flashlight – screw base for size "D" cells
2	Batteries, flashlight, size "D"
1	Fuseholder (Buss type HKL or similar)
1	Fuse, 3 amp for above
	Line cord and attachment male plug to suit.
	Cabinet (see accompanying drawing or purchase Budd No. CU 2110 – Aluminum Minibox) ★





File trays that can be mass produced in a wood shop.

An item for mass production

File Trays

By Arthur E. Petersen

Sollers Point High School, Dundalk, Maryland

PREPARATION for life in an industrial society involves learning personality adjustment as well as skills in production processes. Each year a section of the tenth-grade industrial-arts class is assigned a production job which provides experiences that help to develop these techniques and skills. Prevocational students are chosen to form the nucleus of the group because they will do production work in their future vocational training. The project is usually an article that is needed in the school. This "need" aspect adds the dimensions of public relations and service to our shop work. The procedure that we used was:

The production group met with the instructor to choose from a list of articles needed in the school an item which would lend itself to mass production. The students decided on wooden file trays for teachers' desks because of the appropriateness as individual projects and because of the availability of materials.

The major objectives set up for this activity were to develop: (1) a readiness to assume responsibility; (2) selfreliance; (3) consideration for others; (4) a spirit of cooperation; (5) an understanding of mass-production methods; and (6) an appreciation of industrial-arts programs by those outside the programs.

Organization of personnel was done by setting up a list of jobs necessary for the construction of the project and then determining which students best fitted the qualifications for the particular jobs. Supervisory personnel was organized with duties as follows:

Production Foreman: supervise all operations of production and check on safety measures.

Supply Foreman: supply all rough stock and materials.

Tool Foreman: dispense and receive all tools.

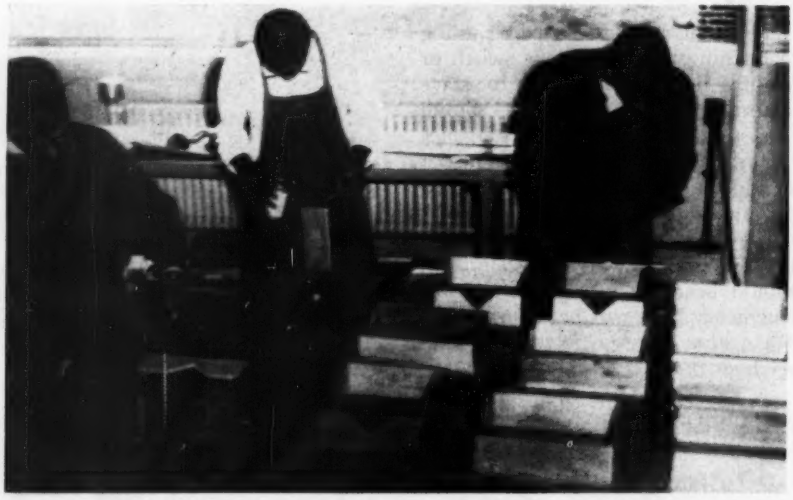
Set-Up Foreman: set up all jigs and machines.

Time Keeper: record time of each individual and time required for each step in the production.

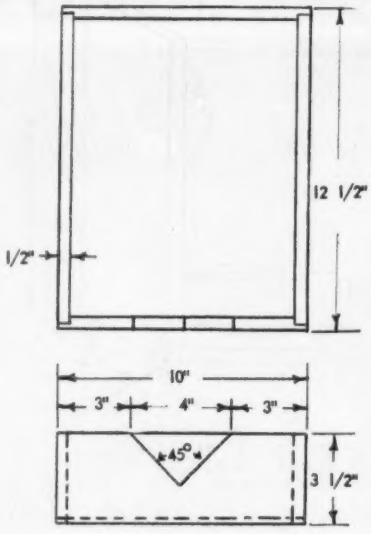
Inspector: check all steps in production for accuracy and quality of work.

Designer: draw plans of project and make up bill of materials.

The supervisory personnel worked in production as well as supervised. The jobs were rotated each week to give each student experience in a different operation. However, the supervisory positions were held by the

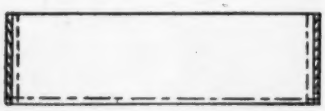


Students at Sollers Point High School (above) assembling ends and sides for file trays.



File Tray

Material: Poplar



same students throughout the activity.

A student who was the best draftsman in the group designed and drew the plans for the project. He also made up the bill of materials. The students met in conference and planned and discussed all of the steps in the production. Each student was assigned a job. A tentative time schedule and completion date were set. Progress charts and inspection sheets were made for keeping an accurate check of progress.

The steps in the production follow:

Operation	Class Periods Needed to Complete Operation
1. Drawing and bill of materials	2
2. Getting out rough stock	2
3. Squaring up stock to size	2
4. Cutting bottom rabbets	1
5. Cutting end rabbets	2
6. Cutting front panels	2
7. Cutting out bottoms	2
8. Sanding	3
9. Assembling	3
10. Finishing	4

Meetings of the supervisory personnel and the instructor were held to discuss production problems such as bottlenecks and quality of materials. (Some of the meetings were "pep rallies" to encourage increased production.)

At one of these meetings it was suggested that the file boxes be presented to teachers, by the boys who made them, at our annual Industrial Arts Quiz Assembly. (The final program of the industrial-arts department is the Quiz Assembly program given in the school auditorium. Winning teams representing the entire school are awarded prizes, which are projects made by students of our department.) This incentive created a desire to turn out a well done product within the time allotted.

The pride that the boys felt when they saw their products used as awards and gifts added reality to the relationship between the producer and consumer. They felt they had participated in a real life situation in which personality adjustments were necessary for good production. They expressed feelings of deep satisfaction that result from accomplishment. ★

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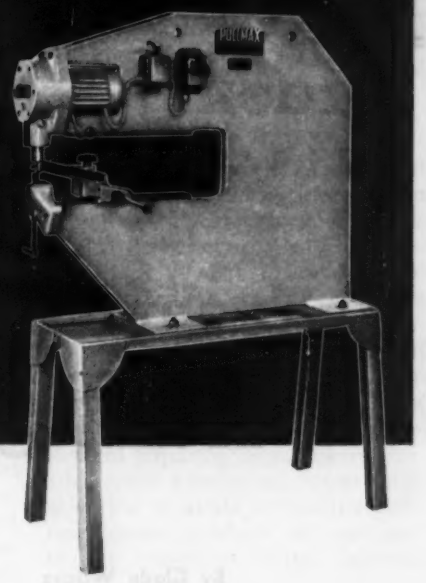

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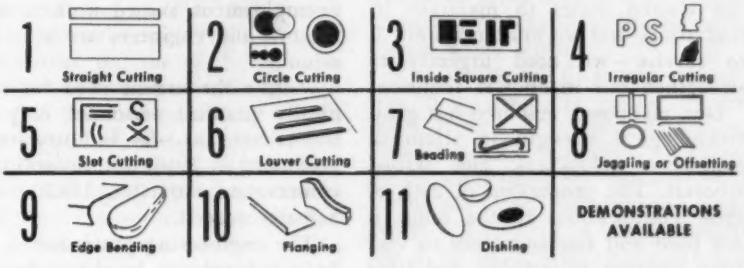

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Where are we going?

Tracing Trends in Technician Training

By Glade Wilcox

Associate Professor, Western Michigan University, Kalamazoo

TECHNOLOGICAL leadership in large part decides who runs the world. The United States, at present, leads but not by a great enough margin to allow those who are concerned about America's welfare to sit by idly while its leadership is threatened. For the United States to maintain its leadership—and we must maintain it to survive—we need urgently to strengthen our manpower resources.

Our manpower resource has great technological strength in scientists, engineers, technicians, and skilled laborers. The proportion of each of these classifications to the other is not hard and fast and tends to vary from industry to industry and from plant to plant.

A survey conducted by the Scientific Apparatus Association Public Information Committee revealed that the present need for technicians—or scientist-engineer helpers—will be more than double in 1968. One leading pharmaceutical laboratory predicts a 150 percent increase. W. J. Henshaw, board chairman, The Henshaw Chemical Company, has said, "I believe the demand for this group will increase more than 100 percent, possibly 150 percent." Donald P. Boyd, of the Curtis Publishing Company, has pointed out that the need for technically trained men will expand with the need for engineers. These sentiments have been emphasized by R. F. Crawford, of the Armco Steel Corporation; Leslie Kimon, vice-president of research and development, Carborundum Corporation; and many other leaders in industry. And in government, Secretary of Labor James P. Mitchell has pointed out that even in areas of heavy *un*employment, skilled workers, technicians, and engineers are at a premium.

Despite the urgent need for technically qualified personnel, only 11,000 technicians—for industry—were graduated in 1956; but, according to conservative estimates, 110,000 were actually needed.

The engineering profession, it has been pointed out by many, has left the realm of application and operation. It has stepped up to the rarefied atmosphere of science. This explosion of engineering has occurred during a critical period and has pointed up the need for a study of the status of training technicians for industry where they will help to fill the gap left by some of the engineers who have "moved up."

Sources of Information

Trends in technician training, which we will be concerned with here, were suggested by a series of studies made to determine progress in training for automation and by a series of studies of post-high-school technical training. These studies were started in July 1953. The last was done in June 1958. All in all, three studies were made of companies which had installed automation equipment, and needed, therefore, trained personnel; and three studies were made of technical schools.

Comparison of data, and other types of information from these studies, with pertinent published information, substantiated one another and indicated a parallelism. What is happening at present in technician training follows:

Semantics.—The first trend is toward a general agreement of definition of terms. The National Conference on Vocational-Technical Education (May 1957), the annual meetings of the American Society for Engineering Education, the report of the President's Committee on Scientists and Engineers, the National Association of Manufacturers' Committee on "Opportunities in Industry as a Technician," and the National Manpower Council have all contributed to a clearer understanding of terms and concepts.

Four-Year Programs.—A second trend is becoming apparent in technical training at the post-high-school level, as well as in technical-preparatory training at the high-school level. Technician education is filling, in part, the void left by the shift in engineering education away from the application level.

A Parallel Suggested

Technical-high-school administrators have come to recognize that with an increase in the ages of people entering industry, their technical-high-school programs should not be considered terminal. They should be preparatory, suggesting a parallel to the trade-preparatory concept. Even the concept of technician education being terminal is being refuted—in some instances—despite Title VIII of the National Defense Education Act. Increasing demands for greater knowledge and skills forced by technological advances have compelled many graduates of terminal technician programs to start—or, rather, continue—self*improvement* programs. Many technicians have improved themselves up to a baccalaureate degree.

Two Developments.—This trend of up-grading by individuals on an individual basis has resulted in two other trends: (1) During the past few years there has been a 100 percent increase in the number of degree-granting, teacher-training institutions offering degrees in industrial technology. This trend has raised the question: How soon will technician training at the junior-college level, community-college level, and technical-institute level be regarded "pre-technical" training? It appears now that some time in the future, training for a narrow, specialized technician occupation will be "phased out" because of technological advances. (2) The integration of technical students with students of other curriculums in general-education subjects looms in the distance as a refutation of the terminal concept of technician training. This practice results in heterogeneous classes—in English, for example—and an upgrading of the academic work done by technician students. Technician students also gain transferable credits this way.

General Education. — The trend toward more general education in technician training has been difficult to discern. One significant factor, however, has been the increase in the number of semester hours required for completion of a curriculum. This has resulted, in some instances, in an increase of the time spent in a program to two and one-half years, and to even three years. One school within the past year upped its program to four years. Time spent at semiprofessional training, though, has not been decreased in any of the instances noted.

Growth. — Another trend is the growth in number of two-year and four-year programs and the increase in enrolments. Studies show there were approximately 76 schools operating programs in 1954-55; 80 in 1955-56; and 120 in 1957-58. This is a 58 percent increase in the number of technician programs during the four-year period. Of the total number of schools reporting, 18 percent indicated they were operating at full capacity.

The average enrolment of the 76 programs in 1954-55 was 387. The average enrolment for 1956-57 was 614; an increase of 16 percent. The total enrolment for 1956-57 was 50,000 technician students.

Solidification of Content.—One of the extremes of curriculum construction is a concept that has developed out of the proprietary trade school. In this type of curriculum, the student may enter school at any time, progress at his own rate, and "graduate" when he reaches a satisfactory skill and knowledge level. Advancement is by passing "ladder"-type examinations. One school in the studies was operating on this principle.

The opposite extreme of curriculum construction, operating in another school, is based on the concept of basic-studies core, technical core, and technical major. The basic-studies core for one of the two-year programs consisted of 28 semester hours of basic studies taken in the departments of science, communications, mathematics, and physical education. Sixteen of these hours are in liberal-arts courses of communication and physical science. In the core are ten semester hours of college algebra and a minimum of two semester hours in physical education or military science.

Unique Concept

One of the unique concepts of this school's two-year curriculum is a technical core of 17 semester hours of technical drafting, technical electricity, industrial processes, industrial relations, and industrial calculators. These courses are required of all two-year graduates. The third group of courses at this same school consists of the technical major in which concentration is in the specialty area of the student's choice. He devotes 16 hours to gaining a salable skill, and five hours to technical electives.

Another indication of the solidification of content is in the increase of texts prepared specifically for technician-level students. Previously, the technician student studied from books aimed at either the trade-school level or the engineering level. Neither of these types of texts was satisfactory.

Series Curriculum

A third indication is in the trend toward building course sequences on a general or basic course with subsequent courses becoming more specific. This trend is apparent due to the number of schools that have switched from a parallel-course curriculum (technical courses are all of the same level of difficulty and students can enter any one without meeting prerequisites) to a series curriculum requiring prerequisites. Parallel-course curriculum construction is typical of trade or manipulative-type courses in which technical content is considered related information.

It appears, too, that mathematics and science content has taken a more logical p o s i t i o n because of the changes in curriculum construction and the general upgrading of texts, as well as technician education, in junior colleges, community colleges, and technical institutes. It can be said, too, that technician training should be predicated on a pure math and science background because technicians *apply* science.

The Changes. — Changing curriculum titles from the specific to the more general is a fourth indication of solidification of content. An example of this is changing "Machine-Tool Technology" to "Mechanical Technology." This kind of change is similar to the changes that have occurred in engineering training.

By classifying curriculums under their generic classifications, it was learned they were distributed as follows:

Curriculum Area	Percentage of Schools Offering the Curriculum
Aircraft	15.0
Automotive	35.0
Chemical	20.0
Civil	45.0
Drafting	65.0
Electrical-Electronics	75.0
Graphic Arts	27.5
Horology	2.5
Mechanical	65.7
Supervision and Management	20.0
Distribution	2.5

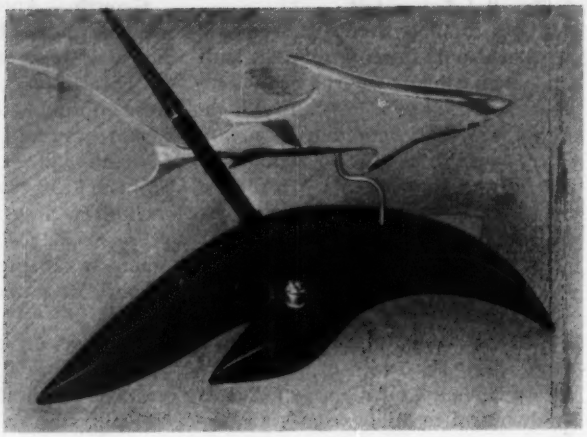
(*Continued on page* 28)

We're surrounded by design hints

Aluminum Desk-Pen Holder

By E. B. Mattson

Carlmont High School, Belmont, California



This shark-motif design was inspired by the ocean, a good hint source.

NATURE offers many designs. Her designs are simple and known to all. The ocean that dashes against our shores hides a wealth of ideas. The flowing and blending lines of ocean life provide many designs that can be transposed into attractive projects. An example of this design is illustrated in this shark pen set.

Once a student becomes aware of design suggestions that can be found in nature, a basic concept of design can be perceived. As the design process begins, the student can easily venture into design of aquatic animals and eventually into abstract forms of sea life. This type of design is easily understood by a student because most boys enjoy fishing or the outdoors and are already acquainted with nature.

The aluminum shark is made of ½" thick aluminum stock, measuring ½" x 4¾" x 12¼". Once the design of the shark has been developed, transfer, or glue, the design to aluminum stock.

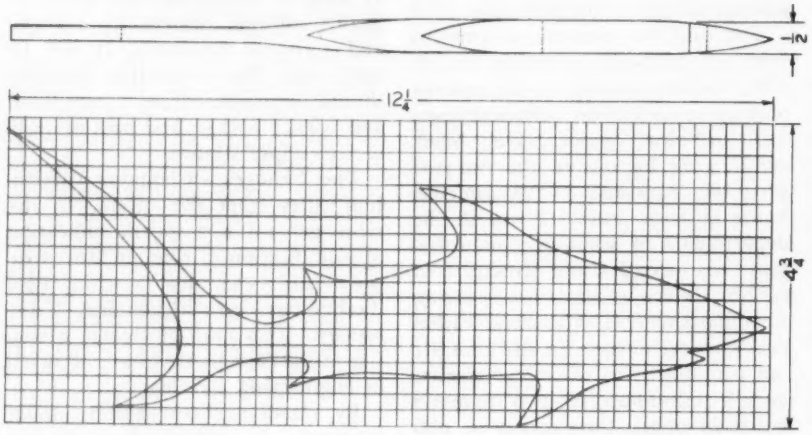
Using a metal cutting band saw to cut out the shark, the cutting process becomes a "piece meal" cutting operation because of the arcs and curves. The rough cut project is then filed and polished to represent the flowing form of a shark, as illustrated.

The buffing operation should be done with great care. A simple aid in buffing, which makes the operation a safe one, is the use of a wood clamp. Clamp the project with one-half protruding from the clamp; buff this section, then reverse ends. The secret of good buffing is the compound. Use black emery compound, which removes deep scratches with ease, then finish buffing with a white compound, which gives a brilliant finish to the aluminum.

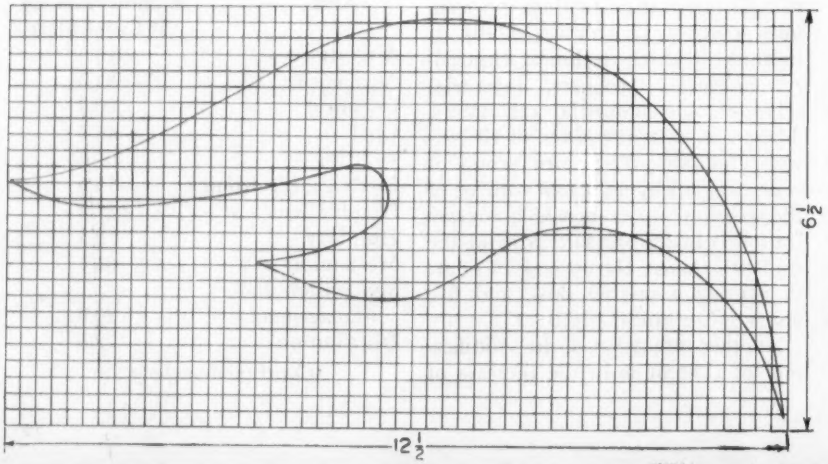
A base for the project is suggested, as illustrated, but other ideas can be developed by the student. The flowing lines of the shark imply movement. A base, therefore, which also gives a sense of movement, or motion, should be developed instead of a square base.

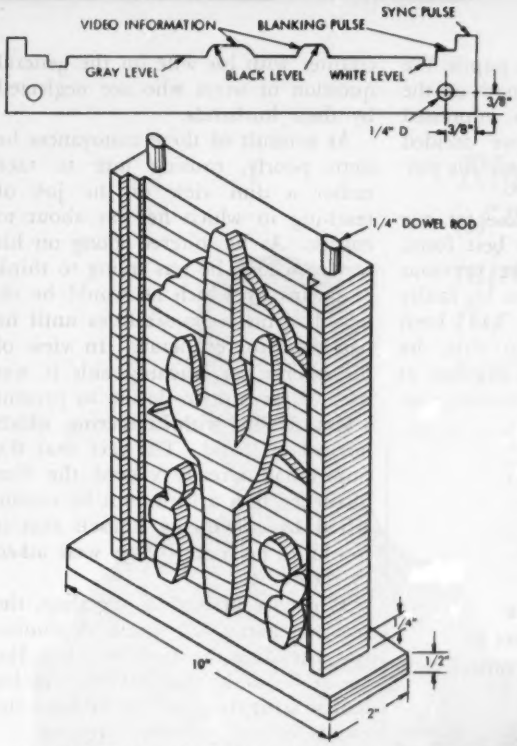
This project offers students a chance to create and design. Learning simple design by using nature can be a gratifying beginning. Once this simple design problem is experienced by students, other forms of design can be attempted with related ease. ★

sculptured aluminum pen set



the base





Shows how video signal is made

Television Signal Demonstrator

By Robert P. Balin

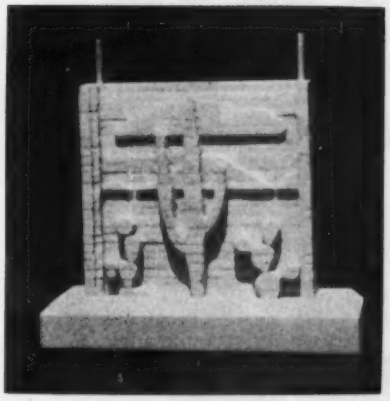
Industrial-Education Department, Arizona State University, Tempe

IN teaching the fundamentals of television it is important to show the relationship between the television signal and the picture that it produces on the screen. We do this effectively with the television signal demonstrator which we recently built in our shop.

The signal transmitted by a television station has a waveform which provides us with the picture information line by line, intermixed with an assortment of necessary blanking and synchronizing pulses. The picture information, or video, and these pulses vary the amplitude of this signal. Within the video portion, the lowest parts of the waveform produce the white areas of the picture; the highest, the black areas; and in between, the various shades of gray.

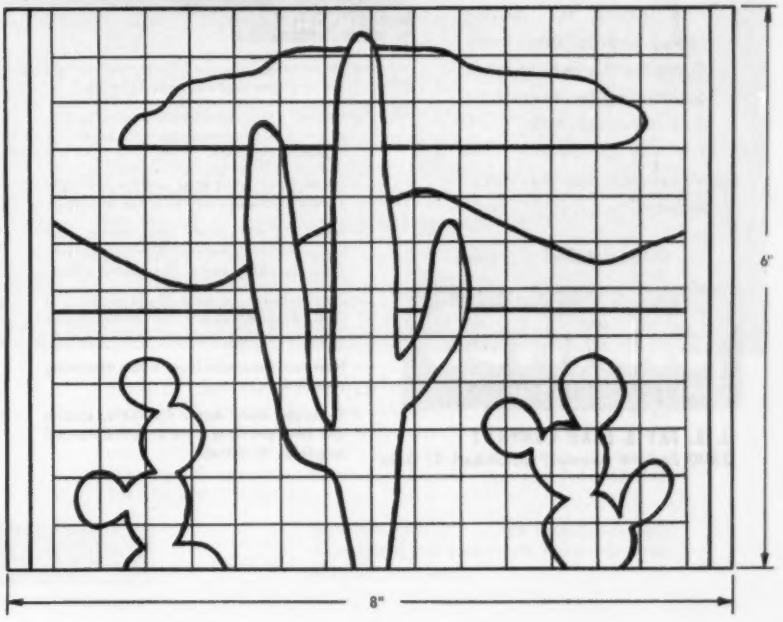
In the actual transmission of television, an uninterrupted series of such lines and pulses are broadcast, and it is the television receiver that divides this continuous signal into individual lines, then electrically places them one beneath the other to form the picture. We do just that with our model.

For the desert scene pictured in the model we jig-sawed each horizontal line section out of ¼" x 1" moulding and stacked them one upon the other between ¼" dowel rod guides. No templates were used. The waveforms representing each line were drawn directly on the blanks. In appearance, the completed assembly resembles a picture carved in three dimensional bas-relief.



Although an actual television picture is made up of 525 lines, we get our points across with this 24-line model. This teaching aid can be constructed in any desired size and divided into any number of horizontal lines to increase the amount of detail in the picture. ★

Three illustrations on this page show how the television signal demonstrator is made (upper left), the demonstrator (at left), and a technique for drawing the desert scene.



Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Visual Aid for Whom?

JIM BAXTER was a strong advocate of visual aids as a means of promoting interest and developing understanding on the part of his pupils. We had heard him orate at length on the subject and we were so impressed by his enthusiasm that we decided to visit his shop and observe his program in action.

On the morning we chose for our visit, Jim was not in his best form. He had been bowling the previous evening and, due largely to his faulty performance, his team had been badly beaten. Added to this, he had arrived at his family wigwam at 1 A.M. and had an unfriendly encounter with his wife on the general question of wives who are neglected by their husbands.

As a result of these annoyances he slept poorly, causing him to take rather a dim view of the job of teaching in which he was about to engage. As he loitered along on his way to school, he was trying to think of means by which he would be relieved of his responsibilities until he had time to recuperate. In view of his interest in teaching aids it was natural for him to decide to present a film, dealing with lumbering, which he had on hand. The fact that the pupils had already viewed the film disturbed him a little, but he rationalized by convincing himself that it would do no harm if they were asked to review it.

When we arrived in the shop, the reel was going full speed. A student was attending the machine while Jim sat at his desk, with his head in his hands, struggling to recover from the events of the previous evening.

As soon as he observed that he had visitors, Jim awakened and proceeded to convince us of the value of films as teaching aids. However, as we talked, we began to suspect that, instead of being an instructional aid, they were actually being used as an aid to the teacher when he craved a recess from his teaching job. They appeared to be a means by which the pupils could be entertained while the teacher rested from his labors. It is to be regretted that this practice is more common than is generally supposed, and it is one which destroys the real value of films as a learning device.

While Jim failed to follow it in practice, he undoubtedly knows that, in order to be effective, the teacher has to be active when a film is being presented to a class. He must prepare his pupils for what they are about to see. During the presentation he should point out the high points in the film. And when the showing has been completed he should check with his pupils in order to assure himself that they understood the relationship between what was shown and the work they are doing.

This is not a criticism of the use of films. Rather is it a suggestion that they should not be used as a means of entertainment and that, if a film has no bearing on the field of work being done in the shop, it has no place in the planning of the contents of the course. ★

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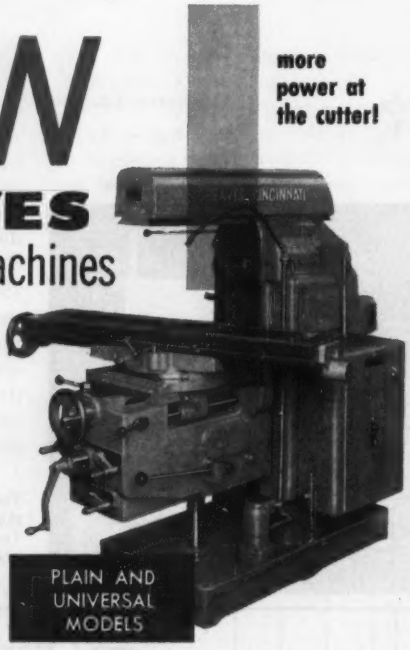
2-XH Milling Machines



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The completely new GREAVES No. 2-XH Milling Machine brings added versatility, increased operational ease, and more power where it's needed most . . . *at the cutter!*
It utilizes two motors, one for spindle drive; a separate motor for moving table, saddle and knee. Compare this and the other outstanding features of the new Greaves Mill. You'll see why Greaves is "The MOST Mill for the LEAST Money."

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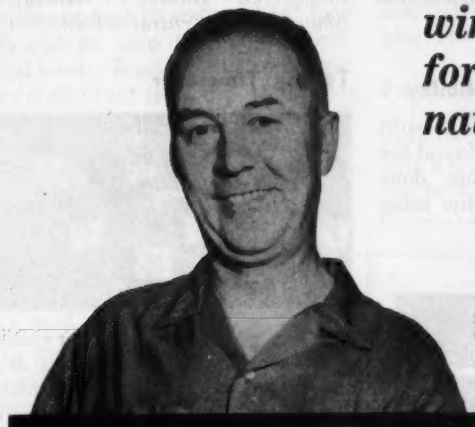
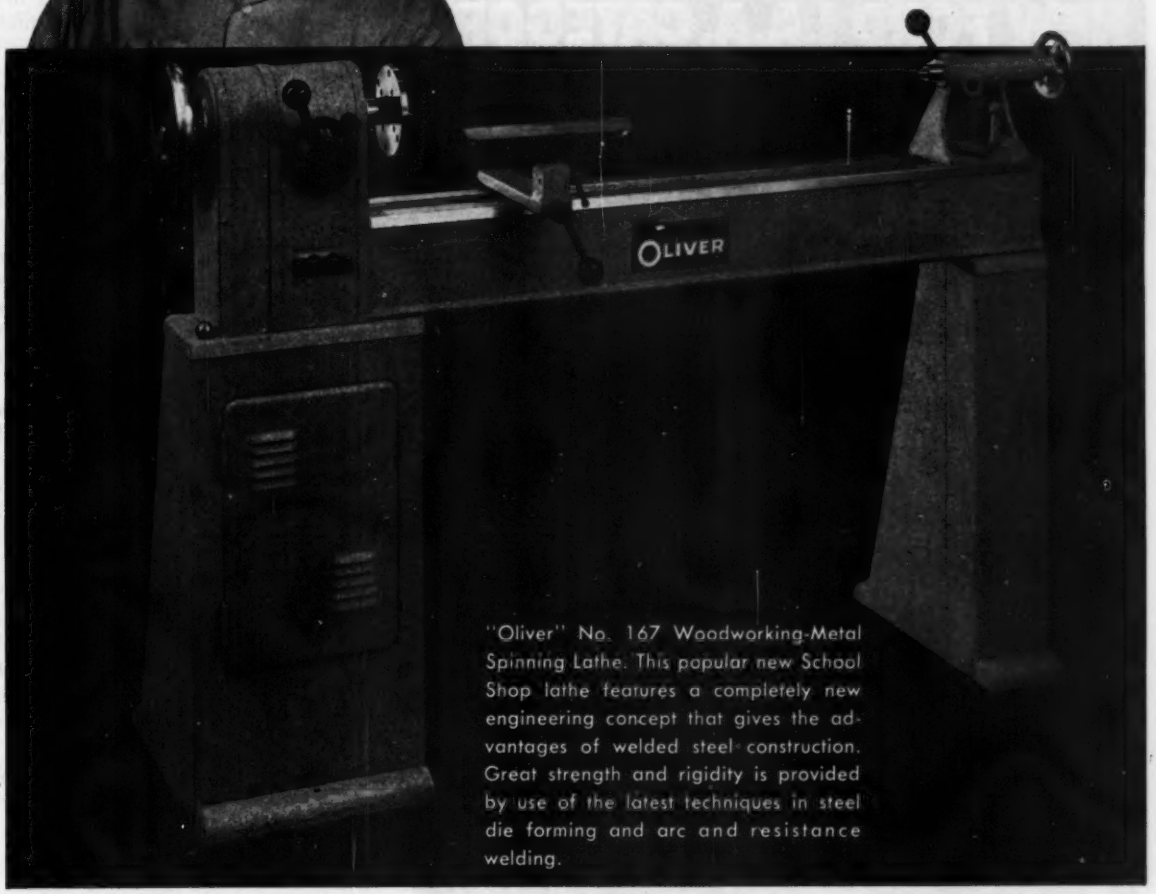
Rigid, all-welded design of "OLIVER" Speed Lathe wins $10,000 top award for Oliver Supervisor in national competition



Ernst Duesing, Supervisor of sheet metal and steel fabrication operations for Oliver Machinery Company, is the proud winner of $10,000 first award in the 1959 Machine Design Award Program of the James F. Lincoln Arc Welding Foundation, Cleveland. Mr. Duesing's entry dealt with the design of the "Oliver" No. 167 Speed Lathe. Cited was the "ingenious adaptation of welded components in the lathe bed, headstock and other elements."



"Oliver" No. 167 Woodworking-Metal Spinning Lathe. This popular new School Shop lathe features a completely new engineering concept that gives the advantages of welded steel construction. Great strength and rigidity is provided by use of the latest techniques in steel die forming and arc and resistance welding.

MORE CAPACITY . . . full 45 inches between centers is more than any other lathe. SAFER . . . mechanical interlock with electrical control system permits starts at slow speed only. GREATER RIGIDITY . . . with welded steel construction, new manufacturing techniques. HANDSOME, MODERN DESIGN.

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Turkish Towel Speeds Photo Print Processing

Spread a Turkish towel over the metal surface of your photo print dryer when processing matte prints. The towel will speed up drying by absorbing moisture from the heated prints. Let the prints dry only until moisture is no longer apparent when a hand is placed on the canvas cover of the dryer. The slightly moist prints should then be removed from the dryer and air dried to minimize curling. — *Harry J. Miller, Gillespie Junior-High School (on leave), Philadelphia, Pa.*

The Name Places Responsibility

When it is necessary to use a paint brush for finishing, we have found the best brush-cleaning jobs are done when we require students, after using a brush and cleaning it, to sign their names to the paper the brush is wrapped in to keep bristles straight. If the job has been well done, it is apparent who deserves the credit. If the cleaning has been done poorly, well, vice versa, and the students police themselves! — *Robert C. Ielfield, Oriskany, N. Y., Central School.*

Testing Timesaver

When giving identification quizzes, much time is often consumed drawing pictures or outlines of tools on the blackboard or on duplicating-machine stencils. As a timesaver, we hit on the idea of using 3 x 5 cards folded in the middle with large numbers inked on them. We have made 50 such cards. Now when a tool identification quiz is given, we place the hand tools on an unused bench with a card for each tool. A master sheet with correct answers is used for checking. The picture shows the arrangement for a quiz on scraping and planing tools. The same procedure can be used for identification of power-tool parts, jigs and fixtures, wood identification, and many other purposes. We have used this procedure with gratifying results.—*Donald F. Kinnaman, Camelback High School, Phoenix, Arizona.*

Doing Double Duty

When a small piece of wood needs to be sanded perfectly flat, try taping a large sheet of sandpaper to the flat metal surface of a circular saw table. Then sand the wood on the paper.

Of course, you will remember to clean off the tape adhesive before you use the saw again. — *C. Wayne Close, Glendale, Ore., High School.*

Recondition Sanding Belts

We have discovered that the lifetime of a sanding belt for portable or drum sanders can be extended by dunking the belts in water and brushing the dirt and glue off with a hard brush. After cleaning, the belt should be given another quick dunking and set up in the proper shape to dry. The belt will be a little stiff after drying due to the slight hardening of the

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The big news from Ford IAA this year is the announcement of an exciting new category in the Models Division for SOLAR ENERGY DEVICES. The sun's energy can be used to cook, purify water and power small motors. Your students' solar energy projects may make a valuable contribution to the development of this new field. But time is running out ! Send for the rules booklet and get your student projects started now. *Entries must be received in Salt Lake City by June 10, in Dearborn by June 25, 1960.*

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I would like to have the official IAA rules booklet and entry blanks. Please send to:
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adhesive, but it will soon gain back its flexibility. — *Albert Straus, M. T. Killingsworth School, Seal Beach, Calif.*

Laminate Bowls

If pieces of scrap lying about the shop are at least 2" wide and 10" long they can be used for making laminated bowls. Black walnut and maple are excellent for this purpose. Be certain, however, to glue on a scrap block behind your bowl stock so the faceplate screws will not ruin your finished product. — *Don Kinnaman, Camelback High School, Phoenix, Arizona.*

On Sharpening Chisels and Plane Irons

In the sharpening of tools such as chisels and plane irons, the wire edge formed by grinding should be removed.

The almost universal way of doing this is to use a whetstone but it is practically impossible to keep a whetstone flat. A suggestion to get the job done comes from the Woodcraft Supply Company. It is a method that insures a flat sharpening surface. It follows:

Use strips of aluminum oxide cloth. For most purposes, 320 grit is about right. Hold a piece of this cloth between your thumb and forefinger over a piece of plate glass, steel plate, or any level and smooth base. — *George S. Eaton, Boston, Mass.*

Drill a Drill

In the shop it is sometimes necessary to drill holes longer than the length of the drill being used. This vexing problem can be solved by adding a steel extension rod to the tang of the drill.

The tangs of most drills are not hardened; thus the drill may be chucked on a lathe and a hole of the correct size to receive the rod may be drilled.

The diameter of the steel rod which is to serve as an extension must be slightly smaller than that of the drill. One end is turned on the lathe to fit the hole in the tang of the drill.

The two are then fitted together and silver soldered. — *Louis J. Enos, Lincoln Junior-High School, Sacramento, Calif.*

Cellophane Diffuses Scratches on Negatives

When enlarging from a scratched negative, wave a piece of crumpled, clear cellophane back and forth quickly between the lens and the enlarging paper. This will diffuse the regular lines caused by the scratches. Be sure to hold the cellophane near the lens to avoid inadvertent dodging and burning. — *Harry J. Miller, Gillespie Junior-High School (on leave), Philadelphia, Pa.*

Project Marking

To identify readily each student's work in the wood shop, mark all parts with a felt-nib marking pen. The work can be marked in the joints or on the back and bottom. Since the ink penetrates, it is hard for would-be thieves to remove the owner's name. — *Don Whisler, Golden Valley Junior-High School, San Bernardino, Calif.*

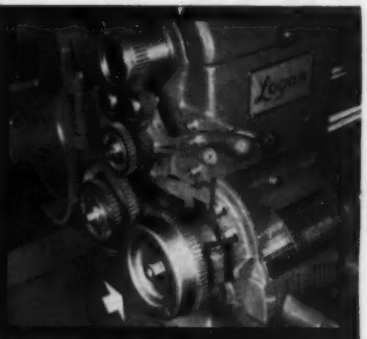
Measure It in Storage

If you use a vertical-storage type lumber rack, try this time saver. Glue or mark "inches" and "feet" marks on the edges of the vertical dividers. Lumber can readily be checked for size right on the rack. — *Robert C. Ielfield, Oriskany, N. Y., Central School.* ★

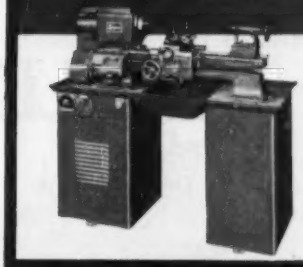
new safety feature!

Logan

Automatic Safety Gear now standard equipment on 10" and 11" models

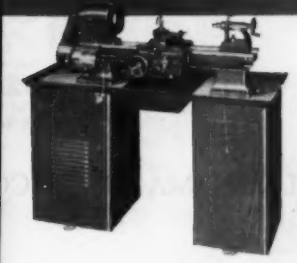


12" Lathe



All Logan 11", 12" and 14" lathes, as well as models 1825 and 1875 (*shown*) 10" lathes, now offer positive overload protection without additional cost. Exclusive Automatic Safety Gear absorbs shock of sudden overloads when threading, preventing gear damage from spindle to gear box. Also protects all gears in gear box up to 52 threads per inch. The combination of this Safety Gear and spring-loaded lever-operated clutch in apron gives the same protection for corresponding feeds. Can be factory-installed on other models of new 10" and 9" quick-change lathes. Available for present Logan quick-change lathes: $10 for 9", 10" and 11" sizes, $15 for 12" and 14".

10" Lathe



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happenings in industrial education

New Virginia Tech School

THE eighth area school in the state of Virginia offering vocational-technical education has been opened in Radford.

The new school, called the New River Vocational-Technical School, is operated by a joint committee of school and business officials from the counties of Pulaski and Montgomery and the city of Radford. Classes are offered in the area of electronics and drafting. Machine shop will be offered when equipment, now on hand, is installed.

The school, located in a remodeled former elementary school, was opened less than two years after the first preliminary discussion on the feasibility of having such a school. Other vocational-technical schools in Virginia are located at Danville, Wise, Abingdon, Fisherville, Norfolk (2), and Petersburg. These are designed for persons who have graduated from, or who have left, regular day schools.

Arizona Officers

DON KINNAMAN, Camelback High School, Phoenix, was elected president of the Arizona Industrial Arts Association for 1959-60 at the annual meeting of the Association in Tucson in November.

Other officers elected were: Bob Mitchell, Cataline High School, Tucson, president-elect; Frank Raymond, Phoenix elementary industrial-arts supervisor, vice-president; and Joseph Littrell, Arizona State University, Tempe, secretary.

Graphic-Arts Exposition

MORE than 100,000 persons are estimated to have attended the exhibits of the Seventh International Graphic Arts Exposition held recently in the Coliseum, New York City. It was the first major graphic-arts show since the 1950 show held in Chicago. The latest developments in machines, processes, and technology were shown.

Adjust to New Techniques

APPRENTICESHIP training in the building industry must adjust to new techniques and new products if it is to survive in the coming construction boom of the 1960's, Douglas Whitlock, chairman of the board of Structural Clay Products Institute, warned in a recent talk before the North Central States Apprenticeship Conference in Indianapolis, Ind.

Mr. Whitlock said that local joint apprenticeship committees now must

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keep abreast of new technical developments in the building field, in addition to supervising apprentice training and the meeting of manpower needs. The committees also must be willing to incorporate in training programs the new skills called for by the new developments.

He urged vocational educators – who were attending the conference along with delegates from labor, management, and state and federal government training agencies – to make full use of related training materials and so to provide the equipment and facilities necessary for their use.

Welding Exposition

THE American Welding Society has announced that its 41st annual convention and welding exposition will be held April 25-29 in Los Angeles, Calif. Technical meetings will be held in the Biltmore Hotel and the welding show in the Great Western Exhibit Center.

CONVENTION CALENDAR

Industrial Teachers Conference, Texas A & M College, College Station, Feb. 26-27.

California Industrial Education Association, Biltmore Hotel, Los Angeles, Mar. 11-12.

New Jersey Vocational and Arts Education Association, Berkeley-Carteret Hotel, Asbury Park, Mar. 17-19.

Ohio Industrial Arts Association, Neil House, Columbus, Mar. 31-April 2.

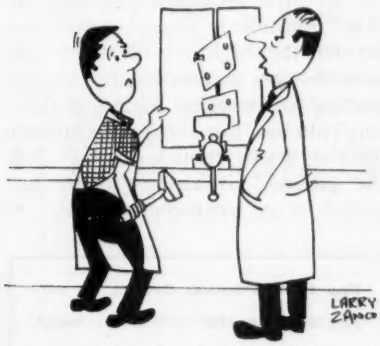
Indiana Industrial Education Association, Meridian Plaza Motor Hotel, Indianapolis, Mar. 31-April 2.

American Industrial Arts Association, Royal York Hotel, Toronto, April 19-22.

New York State Vocational and Practical Arts Association, Hotel Van Curler, Schenectady, April 21-23.

Michigan Industrial Education Society, Lansing, April 21-23.

American Welding Society, Los Angeles, Calif., April 25-29.



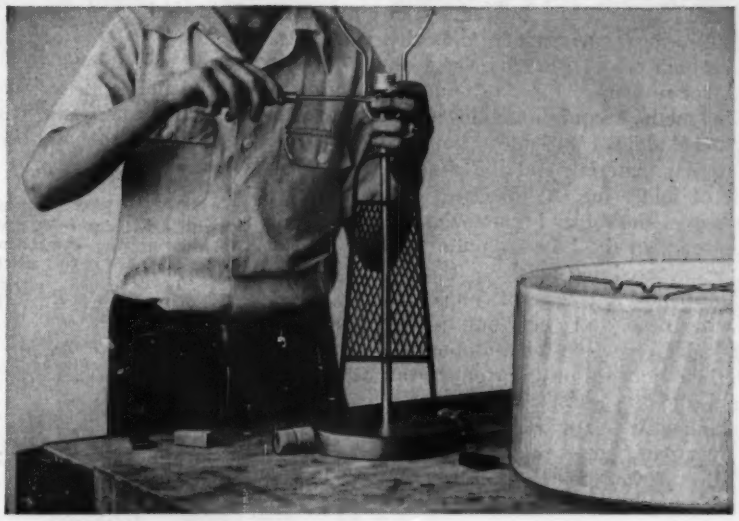
"Ever hear of welding?"

General Electric Aided

INDUSTRIAL-education and technical-education personnel in Kentucky were called on by the General Electric Company recently to assist in the firm's training program for appliance service technicians.

The classes were held at Monogram Hall, Appliance Park, Louisville. The program was sponsored by the Jefferson County Area Vocational School. Some of the subjects taught were problems in human relations, organization and management of industrial procedures, and labor and management problems. ★

This lamp-making project
teaches two lessons



How to make a lamp is just one of the things students learn from this project. . . . Another is how to make a lamp that is also an *efficient lighting instrument*. Such a lamp must be designed with the user and the use in mind, so that it provides sufficient, glare-free light, properly distributed, for the user's needs.

For instance, to make a *table* lamp that does an effective lighting job, you will find this simple equation valuable:

From the average eye-level height of a seated person (40"), subtract the average end table's height (24"). The difference – 15" – is about what this lamp should measure from the table to shade bottom.

This and other valuable lamp-making facts are part of the program, "Working with Light." This program –which helps you teach "the facts of light"– was prepared by the Better Light Better Sight Bureau after consultation with representatives of the National Education Association and others prominent in the field of industrial arts and vocational education. Specially designed for high school and junior high school industrial arts classes, this program includes a 116-page Lighting Handbook, 12 Project Leaflets and a student Reference Folder.

FREE AIDS. A complete package of "Working with Light" materials will be sent to shop teachers *without charge* in areas where there is a Better Light Better Sight Bureau sponsor. (We will check our sponsor list for your area.) To get your materials, fill in and mail the coupon *today*.

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Designed for youngsters

Easy Mounting of Components

By Wesley Laird
Wilson, New York, Central School

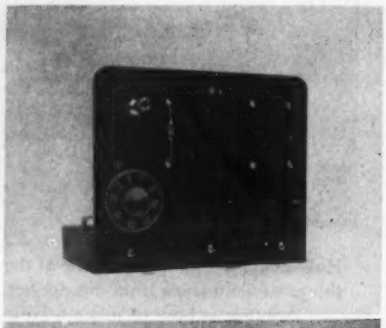
THIS method of mounting components of small electronic projects was worked out by the writer after seeing how much difficulty junior-high school students had with this type of work.

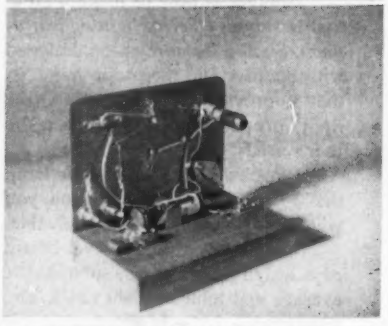
The method requires a nonconducting panel about 1/16" thick (Formica or similar material) and the riveting type of solder lug. A hole is drilled the size of the solder lug and the lug is inserted in the hole with the part to be soldered facing the back side of the panel. A couple of shop-made punches head over the front side of the lug as an eyelet. The components are then mounted on the front of the panel and the leads soldered on the back along with any connecting wires of the circuit.

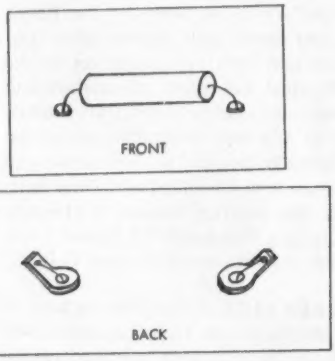
This method leaves nothing suspended in air and makes a neat looking assembly. While not as up to date as the printed circuit board, this method is similar to mounting techniques used in industrial products and kits.

The transistor set shown has a Formica front panel and a wood base. A sheet aluminum frame with a Formica top could also have been used. ★

A transistor set with a Formica front panel and wood base showing the components mounted as they are described in this article.







Course of Study . . . *from page 9*

Each core unit should represent sequential progress in skill and related material. The learner will pass from unit I to unit II and so on, each time choosing the vehicle that interests him most. Increased student planning and initiative should be provided for as the individual progresses through the sequence of units. In advanced units, the student may completely substitute an original design or project for the one given in the unit. It is folly to expect a student to design and make a project until he has learned the basic and fundamental operations involved so that he has an understanding of what can be done and what he is capable of doing.

5. From the skill-information analysis (No. 3), select units of related subject matter that are closely associated with the manipulative core of the course and arrange them so that they will be presented at the time the learner needs them.

6. Plan methods of presenting the skill and related content. This would include demonstrations, operation sheets, job and plan sheets, information sheets, assignment sheets, etc. Along with these should come plans for the evaluation of student progress. A plan for evaluating teaching methods should also be made as methods are successful only if they accomplish that which the user intends them to accomplish.

7. Put the course of study into operation. Keep it alive by using it as you would a tool. Add to it and revise it as you see the need. It should be a dynamic instrument and a thing of force.

A good course of study does not guarantee good instruction but good instruction cannot be had without it. We need to accept the challenge that is before us and make our contribution to the education of our youth one that is noticed and respected. ★

Trends . . . . . *from page 19*

The number of schools involved in technician training has increased greatly during the time period covered in the studies on which this report is based. The distribution of curriculums, however, has not changed significantly. This can be considered further evidence of solidification of content.

Other Trends.—Lesser trends occuring in technician education are particularly apparent in the literature of the field. They are: improvement in guidance and counseling, broader recognition of professional societies, use of industrial personnel on planning and coordinating committees, and teacher-training curriculums designed to prepare teachers for the post-high-school technician level.

These are, then, some of the trends in the development of technician training. They suggest to us how our technological growth is affecting not only traditional general education beyond the high school—more and more colleges and universities are including technological courses in their curriculums – but that technician training itself, though scarcely "off the ground," is already being upgraded to the technological level. ★

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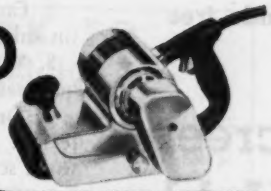

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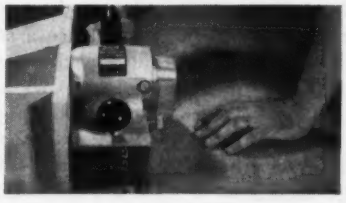

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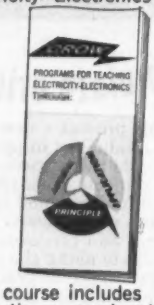

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Silk-Screen Frame Holder

By Emilio C. Prunetti and Robert R. Shields

Student and Instructor, respectively, San Francisco, California, State College

THE method described in this article to hold the silk-screen frame in an elevated position is offered as a suggestion to students and teachers who are having trouble keeping their hands free to print, without having to latch and unlatch some kind of a catch.

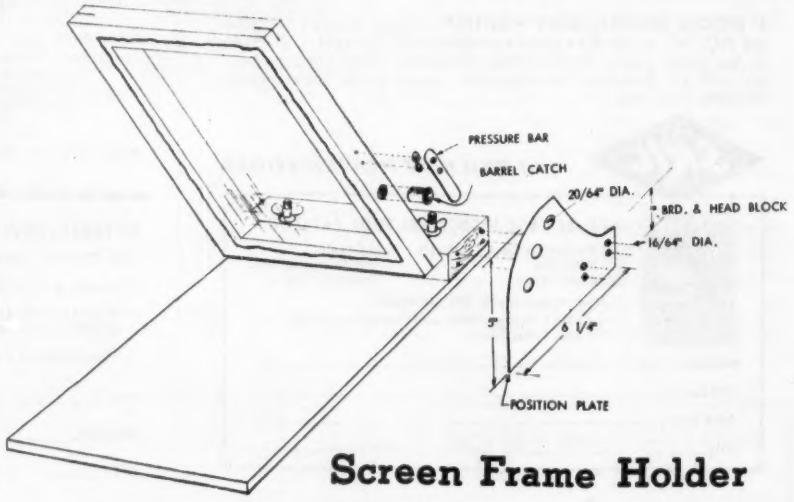
This system has proven efficient and uses the least amount of apparatus to perform the job. The position holder consists of only three sections: a position plate, a barrel catch (a ¾" x ⅝" barrel cabinet catch, obtainable at most hardware stores), and a pressure bar. Lightweight material is suggested to facilitate construction. Where students are able to construct their own silk-screen equipment they will have a chance to apply some bench-metal layout principles. By following the simple instructions offered in this article, in 45 minutes or an hour's time the silk-screen should be ready for operation. Silk-screening for students and yourself should be an even more enjoyable printing process.

The Procedure

1. Trace a pattern (see drawing) on a piece of 22-gage metal.
2. Cut out with a heavy pair of tin snips.
3. Mark the position of mounting holes and screen-positioning holes.
4. Drill or punch all holes. Countersink mounting holes to receive wood screws, if flat-head wood screws are used.
5. Clean up outside edge, face, and back with file and emery cloth.
6. Place position plate on hinge support with wood screws.
7. Lift the silk-screen frame to its maximum raised position, and at the place that was marked through the position-plate hole, drill a 25/64" hole, ¾" deep.
8. Now place the barrel catch in the hole and tap firmly into place.
9. Bring the frame back down to its lowered position by pressing the button of the barrel catch in as it passes under the position plate.

The Pressure Bar

1. From a strip of 1/16" x ¾" cold-rolled steel, or equal, cut a piece 2" long.
2. Round the corners and drill two holes as shown in the diagram. Countersink if flat-head wood screws are used.
3. To place the bar on the frame, allow a ½" lap over the position plate and center the bar on the silk-screen frame as shown.
4. Mark the position of the screw holes and drill the holes to receive the wood screws.
5. Place a small washer, the thickness of the position plate, under the pressure bar and tighten the screws to a proper pressure for free, but snug, movement of the frame as it is raised to each position.
6. Paint or finish as desired. ★



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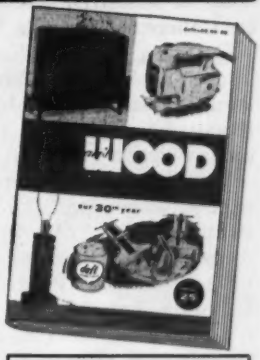

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EDGAR A. KOVNER has succeeded LEE MILLER KLINEFELTER, retired, as director of the Technical Institute of the College of William and Mary, Norfolk, Va.

FRED W. BURT has replaced H. F. BRICKLEY, retired, as supervisor of industrial and vocational education in Muncie, Ind. Mr. Brickley was appointed supervisor of industrial arts in Muncie in 1926.

JOSEPH W. DUFFY, formerly instructor at Junior-High School 190, Queens, N. Y., is now associate professor of industrial arts at Montclair State Teachers College, N. J.

RAYFORD L. HARRIS, formerly at James Blackwell Junior-High School, Richmond, Va., has been appointed assistant professor of industrial-arts education at Virginia State College, Petersburg.

RAY FERRARI, formerly laboratory supervisor at the Air Conditioning Division, Westinghouse, Staunton, Va., is now head of the air conditioning division at the Technical Institute, College of William and Mary.

RAYMOND VAN TASSEL was recently appointed chairman of the department of vocational education, New York University School of Education.

FRANCIS J. KAFKA, formerly teacher at Junior-High School 143, Bronx, N. Y., has been named associate professor of industrial arts, State Teachers College, Millersville, Pa.

CLAUDIUS WILKIN, formerly shop teacher at Monroe High School, St. Paul, Minn., has succeeded BENJAMIN BRYNILDSEN, retired, as supervisor of industrial arts in St. Paul.

VERNON W. HOECHE has been named assistant professor of industrial technology, teaching electronics courses in the department of industrial engineering, Purdue University, Lafayette, Ind.

EMANUEL ERIC ("Leif") ERICSON, professor of industrial education at the University of California, Santa Barbara, for 31 years before his retirement in 1956, died Oct. 28 in Glendale, Calif., after a short illness.

J. W. LEWIS, vocational coordinator at Amory, Miss., has been appointed assistant state supervisor of T & I education for the Mississippi State Department of Education, effective July 1. ★

News ABOUT TRAINING The Technician

Technician Training in Kentucky

SEVEN schools in Kentucky now have programs unfolding, or already underway, for training technicians in the fields of electronics and machine-tool and die design, according to the *Kentucky Industrial Education Association Bulletin.*

The schools are: Hazard Area Vocational School; Mayo State Vocational School, Paintsville; Owensboro Area Vocational School; West Kentucky Vocational School, Paducah; Lafayette Area Vocational School, Lexington; Northern Kentucky State Vocational School, Covington; and Somerset Area Vocational School.

The programs, which are planned in accordance with the National Defense Education Act, place much emphasis on training in mathematics, science, and physics as an inherent part of the curriculum.

Wisconsin Sees Need

A RECOMMENDATION that Wisconsin schools of vocational and adult education be asked to expedite the development of one-year and two-year programs needed in the field of technical education was included in a report recently issued by the Coordinating Committee on Higher Education, established by the 1959 Wisconsin state legislature.

The report also recommended that criterions should be established to determine in which of the state schools such technical programs should be developed and that state aid for the operations of these programs, when duly authorized, should be increased.

Another recommendation was that the schools in which these basic programs are developed should be clearly identified, possibly renamed "institutes of technical education," or some other appropriate designation.

Additional studies are now being carried on.

USOE Pamphlets Revised

NEW, revised editions of U.S. Office of Education publications Misc. No. 3560 and No. 3561 on Title VIII of the National Defense Education Act are now available from the Division of Vocational Education, U.S.O.E.

The pamphlet, Misc. No. 3560, deals with regulations for the administration of Area Vocational Education Programs. Pamphlet No. 3561 contains suggestions to states in promoting, organizing, operating, and appraising programs. Both pamphlets were revised after meetings this past summer between federal officials and representatives of labor, management, and vocational educators. Offensive words, unpalatable definitions, odious comparisons, and restrictive phrases—which caused much criticism of the original publications issued last December—have been eliminated in the revised editions.

Six pages of the 11-page pamphlet, Misc. No. 3561, are devoted to suggestions concerning criterions for approval of area vocational-education programs. The pamphlet also contains suggestions concerning characteristics of training programs for highly skilled technicians in recognized occupations.

More Tech Schools in Minnesota

PLANS for the establishment of three more area vocational-technical schools in Minnesota are now under way. The new schools, expected to be open for enrolments in the fall of 1960, will be located in Brainerd, Staples, and Wadena and will increase to 11 the number of such schools in the state.

The proposed school at Brainerd calls for beginning classes in auto mechanics, electronics, carpentry, and practical nurse training. The Staples school will offer machine shop, tool and die making, and mechanical training. Wadena plans to offer auto mechanics, electronics, practical nurse training, and office training.

Other area vocational-technical schools in Minnesota are now located in Austin, Duluth, Mankato, Minneapolis, St. Cloud, St. Paul, Thief River Falls, and Winona.

More Pay for Technicians

GRADUATES of junior-college technical curriculums in California draw premium paychecks, according to a recent spot check.

Of the eight employers of technical workers checked, six of the companies have special wage or salary schedules for junior-college trained technicians. A seventh company pays more, but the differential depends on the interviewer's evaluation. And the eighth company reported that it is now studying the matter of a special pay schedule.

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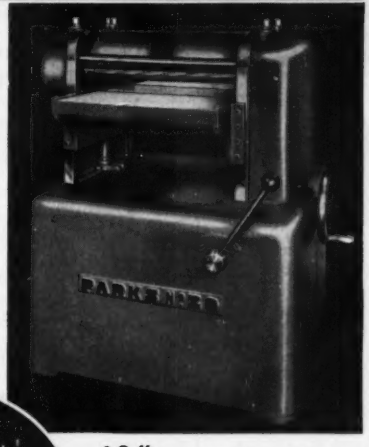

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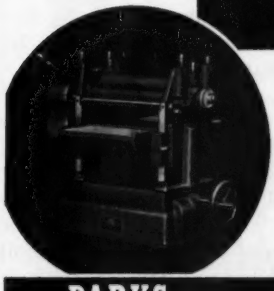

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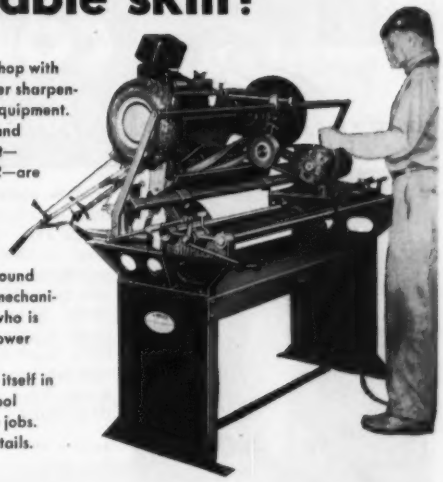

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Nevada Starts Three Programs

THREE area programs for the training technicians in Nevada under the provisions of the National Defense Education Act have been instituted to serve the areas of Clark, Mineral, and Ormsby counties.

The Clark County school district is providing Southern Nevada with electronics technician training, with the cooperation of the University of Nevada Southern Branch at Las Vegas. Forty-five selected high-school seniors are enrolled in the first course.

Fifty-five post-high-school students are enrolled in the Mineral County Electronics Technician School, which is operated by the Mineral County school district.

In Ormsby County, an engineering technician training program has been initiated by the Ormsby County school district. The program is designed primarily to meet engineering and drafting technician needs in the state highway construction program.

Stout Institute's Graduates

STOUT Institute's placement officials have announced complete satisfaction with the number and quality of jobs obtained by the first graduates last June of the new industrial technology program.

Frank J. Belisle, chairman of placement at Stout, reports that all 29 graduates of the new program using the facilities of his office were employed by industry at beginning salaries averaging more than $5,000 per year.

Interest in the program is increasing, Stout officials report. Approximately 15 percent of Stout's 734 men are now enrolled in the curriculum.

Electronic Technicians

ELECTRONIC-technician courses apparently are the most popular of the new courses being offered in New York State under the National Defense Education Act program.

Among the new courses in this field are those at Levittown; Rome Free Academy; Frontier High School, Erie County; Williamsville High School, Erie County; Board of Cooperative Educational Services, second supervisory district of Suffolk County; Board of Cooperative Educational Services, second supervisory district of Westchester County; and Olean High School. ★

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Books:

Graphical Communication. Black. New York: McGraw-Hill Book Co., Inc., 1959. Pp. xi+328. $5.75.

This book was designed as an introduction to technical drawing, sketching, and blueprint reading, and was written especially for training engineering technicians.

Among the many topics covered in the eighteen chapters are auxiliary views, pictorial drawing, intersections and surface layouts, tool and die drawing, graphs, and architectural drawing. Included also is an extensive glossary of engineering terms.

The book is well illustrated, and a list of problems and projects is given at the end of each chapter.

Earl D. Black is Head of Engineering Drawing, General Motors Institute, Flint.

101 Ways to Use Your VOM and VTVM. 101 Ways to Use Your Sweep Generator. 101 Ways to Use Your Oscilloscope. Middleton. Indianapolis: Howard W. Sams & Co., Inc., 1959. Pp. 116, $2.00; pp. vi+138, $2.00; pp. 180, $2.50, respectively.

These books are practical handbooks which have been designed for use by technicians. Here the reader will find practical discussions of problems that appear in each of the fields covered.

The books are organized in units, each treated in detail. This, coupled with the numerous illustrations, make them valuable for anyone who has an interest in the subjects.

Robert G. Middleton is a senior member of Institute of Radio Engineers.

Basic Electronic Test Procedures. Turner. New York: Rinehart & Company, Inc., 1959. Pp. x+316. $6.50.

The author says that this book is for the newcomer to the art of electronic measurements. He says, too, that, "The reader we address will already know the basic principles of electricity and electronics and will be familiar with the circuits and operating theory of common test instruments. His need will be for guidance in the best way to use instruments. This we aim to furnish through simple explanations and step-by-step procedures. Wherever possible, common examples from actual practice will be used for illustration."

Taken into account in this volume are applications of electronics in industry, radio and television, automation, and allied professions.

Rufus P. Turner is a professional registered engineer.

Exploring Patternmaking and Foundry. Miner and Miller, Princeton, N.J.: D. Van Nostrand Co., 1959. Pp. xiv+206. $4.85.

This book contains a presentation of elementary processes in patternmaking and molding. It has been designed to provide pupils with an illustrated word picture of the equipment and methods used in these two important activities in the industrial world. It will be a helpful reference in classes where pupils are exploring various areas of occupational life.

Henry D. Miner is an instructor in industrial arts at the Bowling Green State University, Ohio. John G. Miller is Associate Professor of Education at New York University.

The Diesel Engine. Armstrong and Hartman. New York: The Macmillan Company, 1959. Pp. xviii +360. $8.75.

This book deals with the theory, basic design, and economics of the diesel engine. In logical order, the authors start with a discussion of petroleum and refining methods, then go on to a consideration of diesel fuel combustion, an examination of the effect of forces released by combustion on moving parts of the engine, and then on to the static or restraining parts of the engines.

A final section of the book deals with the economics of diesels, including power application.

L. V. Armstrong, a U. S. Naval Academy graduate, worked for more than 40 years on diesel and gas engines for the Ingersoll-Rand Company. James B. Hartman is head of the mechanical engineering department at Lehigh University.

Machinery's Handbook. (16th Edition.) New York: The Industrial Press, 1959. Pp. 2104. $11.00.

There is little else that can be said about this "bible of the mechanical industries" except that the 16th edition is now off the press.

This edition, however, is the most extensive revision in more than 25 years. Recent or revised engineering standards, both American and British, are included, together with a large amount of general information and mechanical data representing the latest designing and manufacturing practice.

In selecting materials for this edition, the needs of trade and technical schools were considered as well as those of manufacturing institutions.

Whittling with Ben Hunt. Hunt. Milwaukee: The Bruce Publishing Company, 1959. Pp. 160. $3.50.

The author introduces his book with the following statement:

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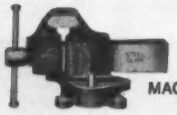

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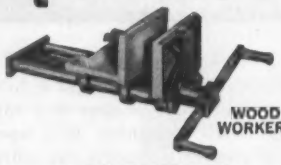

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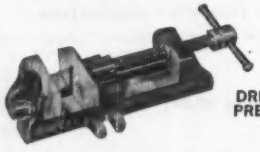

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The book is well illustrated with drawings and photographs. A special introductory section describes the simple tools needed for carving, and how to make them; how to prepare a "Slickemsharp"; and illustrates the basic techniques of whittling.

Ben Hunt is a former commercial artist who now devotes full time to writing and whittling.

They See What You Mean. Burtis and LeMay. Johnson City, N.Y.: Ozalid Division of General Aniline and Film Corporation, 1959. Pp. 88. $3.75.

This book is intended to present a complete treatment on the application of overhead projection in visual-communication situations, and on the many methods available for the production of effective overhead-projection materials.

The book is divided into seven sections. Some of the topics handled are hand-made transparencies, the diazo process, transparency design, and overhead-projection techniques.

The book is well illustrated, using several colors. It is available from all Ozalid audio-visual dealers.

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Trends in Automotive Electrical Equipment is a 66-page booklet published by the Delco-Remy Div., of the General Motors Corporation. It is divided into two parts: (1) passenger-car equipment; (2) heavy-duty equipment. For information about procuring a copy write to the Public Relations Department, Delco-Remy Div., General Motors Corp., Anderson, Ind.

The Dimensioning of Machine Drawings is an 18-page pamphlet by H. L. Campbell that gives in handy, concise, and easy-to-read form all of the information needed to correctly dimension machine drawings according to ASA standards. Notebook size, it can be punched to fit student notebooks. Available for $1.00 from Prakken Publications, 330 Thompson St., Ann Arbor, Michigan. Discount rates in quantity.

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Machine Drafting Data by H. L. Campbell is a four-page chart printed on heavy index Bristol showing reference data most often needed in machine drafting. It follows ASA standards. It is aimed at saving teacher's time because students can find answers quickly themselves. Available for $1.00 from Prakken Publications, 330 Thompson St., Ann Arbor, Mich. Quantity discount rates given on request.

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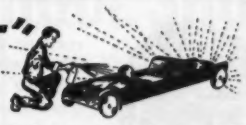

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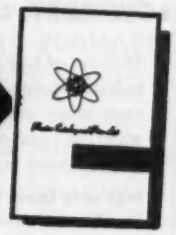

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A complete line of machines and tools for Sheet Metal Work

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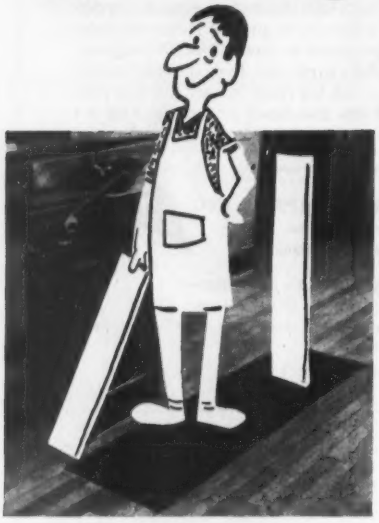
FERROX
Prevents Slipping and Falling



EASY TO APPLY

LOW COST • LONG LASTING

Millions of tiny, sharp, abrasive particles in Ferrox provide safe footing even when covered by grease, oil, water, or metal or wood chips—falls and accidents are prevented.

Not only ideal for shops, but used in shower stalls, dressing room areas, and around swimming pools.

Ferrox can be easily troweled into place. It permanently adheres to wood, metal and concrete and is unharmed by oils and chemicals. Just a thin coating is necessary for long, trouble-free life. Less than 1/16" thick, and therefore does not cause trip hazard as you approach safety mat.

Ferrox can be quickly applied without disrupting schedules or classes. The cost is low—one gallon covers approximately 35 sq. ft.

The Navy uses thousands of gallons to prevent slipping on their ships.

Available in four colors—black, red, grey or green. Write today for Ferrox bulletin, Dept 30.

AMERICAN ABRASIVE METALS COMPANY

465 COIT ST., IRVINGTON 11, N. J.

news from Industry

(Circle the numbers on the card in this issue to secure the items listed.)

Modern Mfg. Co. Introduces 5-Gal. Electric Mixer

A new portable five-gallon electric mixer, the Modern Mixer, has been introduced by Modern Mfg. Co.

The company points out that the Modern Mixer can do a variety of mixing jobs, eliminating the need for large, bulky mixing equipment or hand labor in small mixing jobs. Included among its possible uses in the shop are blending of oils and paints, tumbling of parts, mixing of ceramic materials, etc.

Modern Mixer comes complete with a five-gallon pail, turntable agitator drive assembly, and a 1/3-hp. electric motor with switch and cord.

For more information write the company, 160 N. Fair Oaks Ave., Pasadena, Calif., mentioning SCHOOL SHOP; or *cirtle no. J-1 on the business-reply card.*

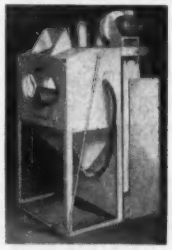
Kool-Vent Safety Shield Combines Vision, Ventilation

The Kool-Vent Shield, claimed to be a new concept in safety face shields that combines vision with ventilation, has been developed by American Optical Co.

The new shield, the manufacturer states, incorporates an optically correct acetate window in a metal 24-mesh screen, 8" x 11½". The shield is held before the face by means of an adjustable fiber headband, which enables it to be worn with or without regular prescription eyeglasses. Acetate windows are available clear, green, or aluminized.

For more information write the company, Southbridge, Mass., mentioning SCHOOL SHOP; or *circle no. J-2 on the business-reply card.*

Ruemelin Lists Many Uses for Utility Blast Cabinets



The Ruemelin utility blast cabinets, now being marketed by Ruemelin Mfg. Co., have been designed to handle a variety of blast cleaning and finishing operations, the manufacturer states.

Some of the applications mentioned for the machine include: deburring gears, sprockets, and cutting tools in machine shops; etching or frosting glass and pottery in ceramics; plating, soldering, and welding; and rust or paint removal from metal. It can be used for instruction in schools in modern cleaning practices, the company states.

The cabinet is equipped with a suction-type blast gun and is complete with cloth-type dust filter, exhaust fan, and motor. The blast compartment is 30" x 20" to accommodate small or medium-sized work.

For more information write the company, 3860 N. Palmer St., Milwaukee 12, Wis., mentioning SCHOOL SHOP; or *circle no. J-3 on the business-reply card.*

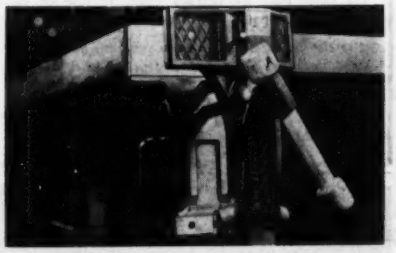
Davey Announces New Line of Tank-Mounted Compressors

A new line of tank-mounted rotary compressors in 2-, 3-, and 5-hp models has been announced by Davey Compressor Co.

Known as Davey Hydrovane Rotary units, these operate at 100 and 200 p.s.i. The manufacturer states that they do not require special compressor rooms or foundations. Units are completely enclosed and there are no belts or couplings. The company also adds that the compressors have 50 percent fewer working parts than other units, assuring freedom from repairs and longer efficient operating life.

For more information write the company, Kent, Ohio, mentioning SCHOOL SHOP; *or circle no. J-4 on the business-reply card.*

Wilton's Universal Turret Vise



A new universal school-shop vise, designed to serve woodworking and metalworking students as well as those in the arts and crafts, has been introduced by the Wilton Tool Manufacturing Co., Inc.

Called the Wilton Universal Turret Vise for General School Shops, the new vise is said to combine all the features of a woodworker's vise as well as a metalworking vise. It has a 3" x 7" woodworking jaw, a serrated steel jaw, 1" x 4", a maximum opening of 5½", and a pipe capacity of ¼" to 4½". It is capable of 180° vertical rotation, the company states, adding that it is also equipped with the Wilton patented Rapid

special

DISCOUNT TO SCHOOLS*

NOW, your school can obtain DURA-BOND'S exclusive universal CAM BEARING TOOL as a teaching aid — at a special low price. This one precision-made tool has a range of application formerly requiring more than 350 driving plugs! The tool comprises 2 driving bars (a third available), 4 neoprene-covered expanding mandrels and 2 expanders.

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Gas-fired, will use any type gas; manufactured, mixed, natural, bottled, cylinder.

No. B 1½ Speedy Melt Furnace
Capacity in brass 55 lbs.; aluminum 16 lbs.; Grey iron 55 lbs. Package Unit includes blower and crucibles.

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McENGLEVAN HEAT TREATING AND MANUFACTURING CO.

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If there's a "CATCH" to it —SWENSON has the answer

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Now! Many different and worthwhile shop projects made possible with

TRIANGLE'S

"Lazy Susan" BEARINGS

Students discover it's easy and fun to make revolving fixtures, turntables of all types. Easily installed, "Lazy Susan" bearings can be used to create items such as: trays and tables, shoe racks, book shelves, boat seats, (you'll think of dozens more!). Write for free literature and name of nearest distributor.

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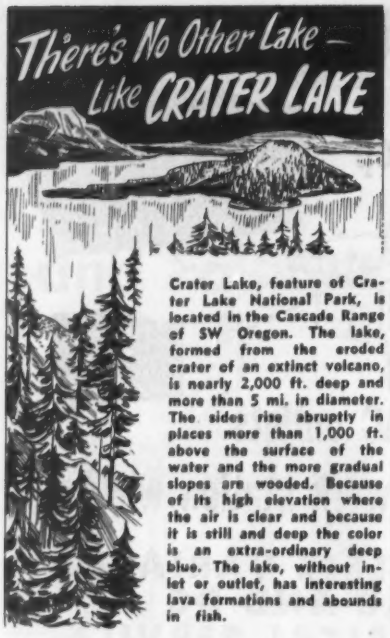
TRIANGLE MANUFACTURING CO.
722 Division St., Oshkosh, Wisconsin

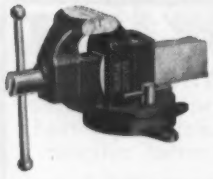


Crater Lake, feature of Crater Lake National Park, is located in the Cascade Range of SW Oregon. The lake, formed from the eroded crater of an extinct volcano, is nearly 2,000 ft. deep and more than 5 mi. in diameter. The sides rise abruptly in places more than 1,000 ft. above the surface of the water and the more gradual slopes are wooded. Because of its high elevation where the air is clear and because it is still and deep the color is an extra-ordinary deep blue. The lake, without inlet or outlet, has interesting lava formations and abounds in fish.

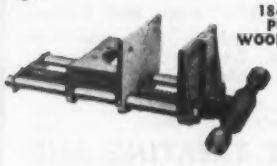
NO OTHER VISE LIKE

MORGAN

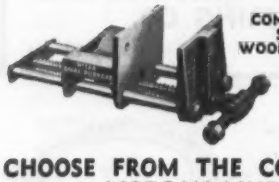
First in Schools Since 1892



MACHINISTS' BENCH
Solid jaw and swivel base



18-A DUAL PURPOSE WOODWORKING VISE



CONTINUOUS SCREW WOODWORKING VISE

CHOOSE FROM THE COMPLETE MORGAN LINE

For your next vise purchase consider Morgan, the vise with the unconditional guarantee without time limit restrictions. You have your choice of a complete range of sizes and types with Morgan's Woodworkers' (with solid aluminum handle) Machinists', Pipe and Combination Pipe Vises. When ordering complete bench unit from your bench mfr. specify Morgan Vises.

Write for complete Catalogue

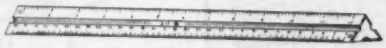
MORGAN
VISE COMPANY
112 N. JEFFERSON ST.
CHICAGO 6, ILLINOIS

Titan Nut, permiting quicker and easier opening and closing of the vise.

The Universal Turret Vise, the company asserts, is suitable for use in woodworking, metalworking, electrical, sheet metalworking, and craft courses, allowing instructors to teach more shop subjects in the same shop.

For more information write the company, Schiller Park, Ill., mentioning SCHOOL SHOP; or *circle no. J-5 on the business-reply card.*

Alvin Hardwood Triangular Scales



Alvin & Company, Inc., states that its new hardwood triangular scales Nos. 110 and 111 are ideal for students.

The engineers' and architects' graduations on the scales are clearly imprinted in black against a cream-colored, lacquered-finished surface for easy legibility, the company asserts. Scale No. 110 has the architects' graduations, and scale No. 111 has the engineers' graduations.

For more information write the company, 611 Palisado Ave., Windsor, Conn., mentioning SCHOOL SHOP; or *circle no. J-6 on the business-reply card.*

Stamp Engraving Tools Decorate Sheet Aluminum

Stamp Engraving is a new method of metal decoration introduced by Tandy Leather Company to enable hobbyists and students to produce an array of aluminum jewelry and household articles.

The new handicraft employs a series of stamping tools which, when hammered on sheet aluminum, create decorative patterns, said to be as intricate as expensive hand engravings. Bracelets, tie-clips, ashtrays, buckles, and a host of other articles can be decorated by the stamping tools, the company states.

For more information write the company, Fort Worth, Texas, mentioning SCHOOL SHOP; or *circle no. J-7 on the business-reply card.*

New Carboloy Toolholder

A new toolholder for disposable carbide inserts featuring an indexing, fully adjustable chip-breaker of solid carbide has been introduced by the Metallurgical Products Department of the General Electric Company.

Called the Carboloy Adjust-o-Breaker, the new toolholder is available in 30 different models. It is said to provide positive setting of the chip-breaker and infinite adjustment

AJUSTRITE
CHAIRS AND STOOLS

Model S-1827

LABORATORY AND SHOP STOOLS

- Adjusts to fit any student
- No soiled hands when adjusting seat

Model S-1827 has 13" diameter steel seat. Seat adjusts from 18" to 27". Steel glides.

Model RSS-2230 has 16" diam. tubular steel footring welded to base. 13" diam. steel seat adjusts from 22" to 30". Casters, backrest, wood seat, seat pad or cushion available for both models.

Model RSS-2230

FREE TRIAL Use an AJUSTRITE chair or stool for 30 days without obligation. Prove to yourself the many advantages AJUSTRITE offers in comfort, utility and economy. Write today—we'll do the rest.

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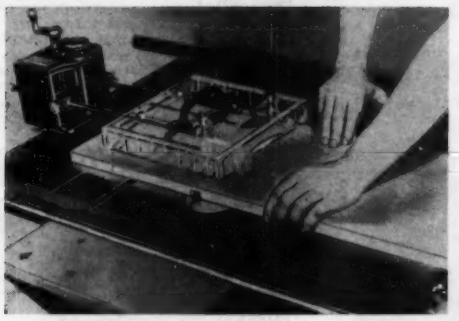
for CIRCULAR SAWS... SEE what you SAW with BRETT-GUARD!



the PRECISION TOOL that GUIDES while it GUARDS . . . SAFETY plus!

Sensational new **transparent** guard for all circular saws is also a **precision-designed** tool for guiding the work! **Recommended and used** by industry, government agencies and school shops from coast-to-coast! Now in nationwide use in vocational schools including such major cities as Philadelphia, Dallas, and Dayton.

Simple to set up . . . **economical** for jobs of any size . . . so **safe** that it's being used by vocational schools for the blind! Made of transparent Plexiglas, fully adjustable for all cuts, even the very difficult ones! Fits all table-type saws for 6" to 22" blades. **Write today!**

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Modern School Shop Planning

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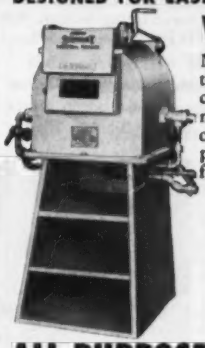

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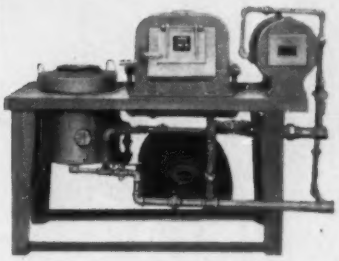
No. 128 Wide Range Oven provides wide temperature range; 300° F. to 2400° F; covers practically every phase of heat treatment. Can be used for annealing, pack carburizing, hardening, preheating, tempering and general heat treating. Ideal for general school use.



ALL PURPOSE FURNACE

Triple Purpose D, illustrated at right, is a combination pot, oven and forge furnace. Can be used for oven furnace hardening—lead, salt or cyanide hardening—lead, salt or oil tempering—forging, welding, tool dressing—annealing, normalizing, pack carburizing—non-ferrous metal melting. Also available in other combinations.

Sunbeam also builds a companion Charcoal Generator and 450° F. to 2450° F. Electric Furnaces. Information and prices sent immediately.

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14" AND 20"

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within its range through the use of a locating pin mounted on a lead screw in the holder shank running parallel with the cutting direction. All cutting pressure is taken on keys and major clamp screw, the company states.

For more information write the company, 11177 E. Eight Mile Road, Detroit 32, Mich., mentioning SCHOOL SHOP; or *circle no. J-8 on the business-reply card.*

New Black & Decker Power Plane

A new power plane, now being produced by the Black & Decker Mfg. Company, is said

to operate by direct drive (without gears) at speeds up to 21,000 rpm to produce an extremely smooth, level finish. The company states it is designed for fast, precise edge-work.

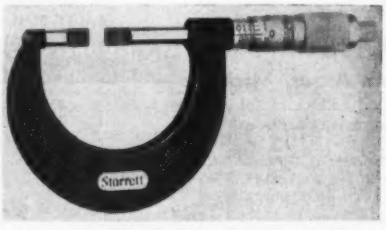
Built-in features in the new power plane, the company states, include special Black & Decker motor and lubricant-sealed ball bearings; fully adjustable cutting depth and edge guide for mitre-planing up to 45° inwardly and up to 30° outwardly; and a "flat top" designed motor housing that permits standing the complete tool on end for convenient depth or angle adjustment.

Powered by a 1-hp motor, the unit operates on standard 115-v or 220-v current, ac or dc, the company states, adding that standard equipment includes a three-wire cable for grounding, heavy-duty toggle switch, straight-face cutter, and arbor.

For more information write the company, Towson 4, Md., mentioning SCHOOL SHOP; or *circle no. J-9 on the business-reply card.*

Starrett's New Calipers Have Blade-Type Anvils and Spindles

A line of micrometer calipers with blade-type anvils and spindles is now being offered by The L. S. Starrett Company.



The new micrometers, designated as Starrett No. 486 Series, are designed to facilitate measuring depths of narrow grooves, slots, keyways, or recesses; or for measuring diameters between lands, fins, or ridges, such as on circular forming tools.

The blade-type anvil and spindle is only .030" thick, the company states, and will measure depths up to 5/16". The micrometers are available in five size ranges.

For more information write the company, Athol, Mass., mentioning SCHOOL SHOP; or *circle no. J-10 on the business-reply card.*

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for CREATIVE IDEAS and SUPPLIES

Mosaics
Imported ceramic or glass tiles make beautiful mosaic designs.

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Illustrated instruction and idea catalog.
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you the Booklet listing over 200 Patterns and the catalog FREE.

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From ordinary plate glass you can create the most beautiful jewelry, dishes, bowls, mobiles, ornaments.
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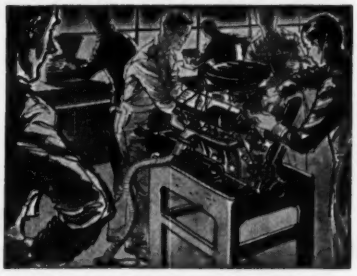
Keep Sickening Exhaust Gases Out Of Your School Shop



NATIONAL Systems remove poisonous carbon monoxide gas right at the source . . . the exhaust pipe . . . and carry it to the outside without heat loss in your shop. No rearrangement of your present shop layout necessary. Choice of 6 overhead or underfloor systems, which can be engineered to each individual application using standard "packaged" kits, including motor, blower, ducting, flexible tubing, etc., ready to install. Tell your architect or write for literature.

National SYSTEM
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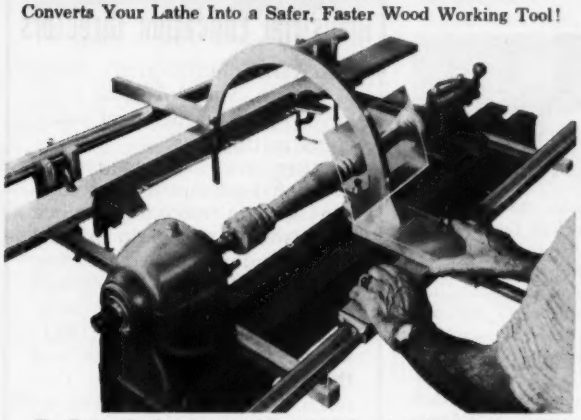
THE AMAZING GIZ...

Converts Your Lathe Into a Safer, Faster Wood Working Tool!



The first major improvement in wood-turning since the invention of the lathe, THE GIZ adapts to all wood-turning lathes. Beginners and amateurs turn out skillfully finished work; professionals increase their speed and accuracy almost beyond belief.

NOW... Let GIZ increase your **safety, versatility, pleasure!** Enjoy **absolute accuracy** in duplication, and prove to yourself that old-fashioned tool rests and dangerous chisels are obsolete.

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New Power Tool Combination Introduced by Skil Corp.

A new power tool combination that can be used as either a high-speed plane or a router has been announced by Skil Corporation.

The company announces that the combination unit saves about half the total cost of the two separate tools. It consists of a ¾-hp router motor, router base, and plane attachment. The plane attachment is adjustable for bevel cuts inwardly of 45° and outwardly 15°. Depth of cut is adjustable to ⅛" and width of cut is 2⅜", the company says.

For more information on the new combination unit write the company, 5033 Elston Ave., Chicago, Ill., mentioning SCHOOL SHOP; or *circle no. J-11 on the business-reply card.*

Deft Wood Finish in a Spray Can

Deft Wood Finish is now available in a 16-ounce aerosol spray can, the manufacturer, Desmond Bros., announces.

The spray can application is recommended for touch-up and for small furniture pieces where brushing is difficult, the company states.

For more information write the company, 1526 W. 228th St., Torrance, Calif., mentioning SCHOOL SHOP; or *circle no. J-12 on the business-reply card.*

Vu-Graph Illustrations Can Be Made with Beseler's Starter Kit

Charles Beseler Company has introduced a Beseler Starter Kit which makes available to users of Vu-Graph overhead projectors a complete selection of tools and materials for making professional-looking illustrations.

The "sampler" kit provides for color as well as black-and-white transparencies. The kit includes acetate sheets, mounts, film, tape, special pencils, inks, brushes, cleaners, tracing pad, etc. It comes complete in a heavy-duty, leatherette covered case with hinged drop-front that can serve as a permanent, protective Vu-Graph transparency case, the company asserts.

For more information write the manufacturer, 219 S. 18th St., East Orange, N. J., mentioning SCHOOL SHOP; or *circle no. J-13 the business-reply card.*

Allied Radio Announces Two New Items

Two new items have been announced by Allied Radio Corporation—a Knight KN-728 28-watt stereo amplifier and a Knight KN-3000 electrostatic speaker system.

IMPORTANT NOTICE
To
Industrial Education Directors

who want complimentary copies of SCHOOL SHOP to come regularly to shop teachers and supervisors in this area:

Because our auditors require proof that persons on our mailing list are receiving SCHOOL SHOP, we ask you to do this: At the beginning of each school year send us a list of all shop teachers and supervisors in your area. Include the name of their school, the school address, and the specific shop subjects they teach.

Please list all shop teachers on your list whether or not they are now receiving the magazine. Those names for whom we receive no reply will be removed from our mailing list.

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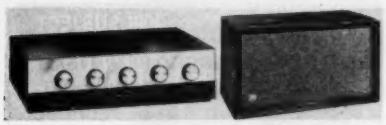

The stereo amplifier provides 28 watts of stereo or monophonic sound with a peak rating of 56 watts. The dual preamp control section has the master volume, single-knob balance, stereo reverse, and rumble filter.

The electrostatic speaker system consists of a 12" high-compliance woofer and two Janszen electrostatic radiators with built-in power supply and filter network. They are installed in a compact, acoustically correct enclosure.

For more information write the company, 100 N. Western Ave., Chicago 80, Ill., mentioning SCHOOL SHOP; or *circle no. J-14 on the business-reply card.*

New Literature:

Your Schools Graphic Arts Department—Printing Presses, Paper Cutters is a 36-page booklet recently issued by the Chandler & Price Company. In addition to describing the company's line of presses and paper cutters, the booklet also includes sections on determining equipment requirements, floor space needed, useful tables, a graphic-arts dictionary, and an ink trouble chart. For a copy of the booklet write to the company, 6000 Carnegie Ave., Cleveland 3, Ohio, mentioning SCHOOL SHOP; *or circle no. J-15 on the business-reply card.*

Better Air Is Our Business is the title of a 16-page composite product bulletin recently issued by American Air Filter Company, Inc. It contains a description of the company's complete line of products. Included in the bulletin (No. 518) are descriptions of fans and blowers and dust-control equipment. For a copy of the bulletin write the company, 215 Central Ave., Louisville 8, Ky., mentioning SCHOOL SHOP; *or circle no. J-16 on the business-reply card.*

Catalog No. M-2060 describes the new Cincinnati Intraform Machines, said to be a new development in the chipless machining process. Copies of the catalog are available by writing The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, mentioning SCHOOL SHOP; or *circle no. J-17 on the business-reply card.*

Seals and Finishes is a pamphlet prepared by the Penetone Company, which includes a discussion of Newvar, a new wood protective finish which is said to penetrate deeply and adhere firmly to the fibres of all types of wood, providing a nonpeeling, nonflaking surface. Newvar comes in a clear form for natural wood effect and in six functional colors. For a copy of the pamphlet write the company, 74 Hudson Ave., Tenafly, N. J., mentioning SCHOOL SHOP; *or circle no. J-18 on the business-reply card.*

Paper Drilling Machines is an attractive 20-page catalog just issued by Challenge Machinery Company. The booklet features a handy selector guide of 10 different single spindle drill models. For a copy of the catalog, No. F875, write the company, Grand Haven, Mich., mentioning SCHOOL SHOP; *or circle no. J-19 on the business-reply card.*

"Take the 'Ouch' Out of Cleaning Costs!" is a four-page folder issued by Ace-Sycamore, Incorporated, of Sycamore, Ill., which describes the company's line of portable blower-vacuum cleaners. For a copy write the company, 448 DeKalb Ave., Sycamore, Ill., mentioning SCHOOL SHOP; or *circle no. J-20 on the business-reply card.*

Washington . . . *from page 52*

work injuries and deaths are kept at what is, compared with a generation or two ago, a reasonable level.

The point about this waste of human resources is that it is still deplorably high. And the point about the safety-education movement is that it has to be sustained and reinvigorated each year, each month, each day. This is the purpose of the yearly President's Conference on Occupational Safety, this year to be held in Washington, March 1. School-shop safety will get high billing at this conference, higher than in any previous year, we are told.

In past years, school-shop safety has been relegated to a panel or workshop discussion, outside the main stream of the President's conference. This year, the subject will be brought

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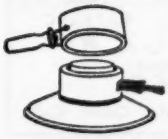

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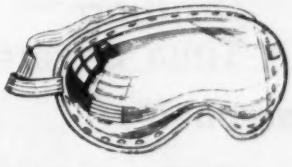

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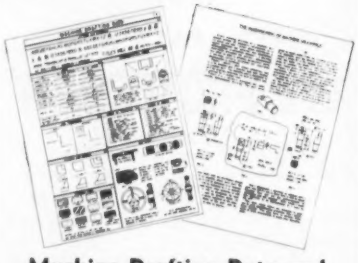

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before the entire delegate body – some 3,000 in number. According to present plans, Jack Walsh, U. S. Office of Education, will conduct a discussion with half a dozen or so representatives of industry, labor, and education on the subject, "The challenge to schools for safety in a changing world."

As a contribution to the reinvigorated interest in school-shop safety, Jack Walsh is sending to the printer two documents. The first of these is a report of an Office of Education conference on what the school-shop teacher can do to promote occupational safety (the conference was held in April, 1959). The second is entitled "A Guide for Improving Safety Education Programs in School Shops." This second document will contain some well known, but all too little used, materials and facts. It will include a list of safety practices for school-shop teachers, developed by William A. Williams, Pennsylvania State University; the national standards school-shop safety inspection check list; and suggestions for using student accident reports.

"Me, use a student accident report? We haven't had a shop accident in years." This is the reaction of many a shop instructor when the subject of shop safety is brought up. But if school shops are relatively safe, why is it that the majority of accidents in industry occur to beginning workers – young people scarcely a year out of school? It is partly because the school shop does not implant deeply the habit of safety – the safety consciousness. Who says that? The bible of safety education. This is the well known, five-times-reprinted bulletin of the U. S. Labor Department titled *Safety Subjects.* As a source book of facts and inspiration for safety education it is without peer. And before we put it down, we'll quote one sentence and one bit of advice from that document. Says *Safety Subjects*: "Much more thorough and careful attention to safety in vocational training of every sort is needed." And for a five-second refresher course on how the shop teacher might develop a safety training procedure, consider:

"To implant in the learner a safe habit of doing a job –

"Tell him.

"Show him.

"Have him do it.

"Correct him until he has it.

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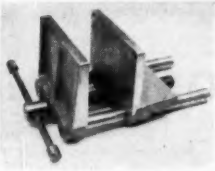

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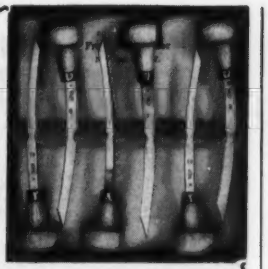

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In Retrospect. – Now begins a new year, and in its honor we lay aside, for the moment, the ticker-tape of events to take a long look at the year just past and the one just beginning. What forces and events have marked 1959? What forces will continue to exert their influence in 1960?

Five major forces were working for change in American education in 1959; these same forces will also influence events of 1960. For vocational education, here they are in order of descending potency.

1. *The Soviet challenge.* Don't scoff at Russian claims that Soviet industry will outstrip ours in a short time, says Allan Dulles, of the Central Intelligence Agency. The Russians are *already* ahead of us in the vital machine-tool industry, says Dr. Seymour Melman, an American industrial engineer. These are but two pieces of evidence which support the contention of AVA's M. D. Mobley that the Russians have declared economic war on the U. S. and are using vocational and technical training as instruments in that war.

Americans recognized Russia's challenge in education and training as a result of the sputniks and luniks. Fewer recognized the impact of the law passed by the Supreme Soviet December 24, 1958. The consequences of this legislation were beginning to tell in 1959; will grow during 1960 and after. Briefly, the December 24 law seeks to eliminate from Soviet life once and for all the separation between labor and learning, theory and practice, mental and manual work. All Russians are to be exposed to continuous free education; but all are also to be subjected to large doses of work experience – beginning in the first grade. The Soviet challenge may tire, irritate, or anger Americans in 1960, but they will not be able to ignore it.

2. *The National Defense Education Act.* Here is the second force creating change and ferment in the whole of American education. And this despite widespread dissatisfaction. Labor is only one of several groups unhappy with the act. Some educators think that most of the act's ten titles impose too many controls on state and local school systems. Others don't care about the controls, but want more money. Still others think the act is damaging the chances of a "true" federal-aid-to-education measure, one like the Murray-Metcalf bill, which would provide money for teacher sal-

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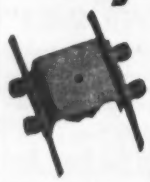

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aries and school buildings rather than to special subject-matter fields. But educators accepted $115,000,000 last year; and are accepting $150,000,000 next year to carry out the act's bidding. Few things in American education will remain the same as a result of the act's operations – certainly not guidance, counseling, testing, science, math, foreign languages, statistical services, audio-visual aids, technician training, or graduate study.

3. *The Ford Foundation.* Using about $100,000,000 each year for new disbursements, this giant gadfly is also seeking to change traditional school teaching and administrative practices. Three years ago many educators ignored the Foundation; two years ago some educators fought it; last year more and more schoolmen recognized the worth of Foundation activities. There's still bitter opposition to its alleged biases. But the Foundation is pouring money into experiments with teacher education, TV teaching, use of teacher aides, teacher teams, new ways to build classrooms and methods for utilizing teaching machines. You'll be hearing more about the Foundation in 1960.

4. *The critics and observers.* At one end of the spectrum stands Admiral Rickover, who would like to re-do about 90 percent of American education. At the other end stands James B. Conant, who took for himself the role of inspector-general for American education. Dr. Conant believes the American high school is substantially sound and, except for doing better some of the good things we're already doing, he wouldn't disturb 90 percent of our secondary-school system. These two gentlemen made news in 1959, and will continue to do so in 1960 as they inspect, criticize, and propose changes and improvements in American education.

5. *The segregation cases.* The depth to which the U. S. Supreme Court ruling cut into the nerves of the public schools can best be understood by reading the near-epic, neo-tragic account of the U. S. Commission on Civil Rights published late in 1959. The Commission devoted 36 pages in its first report to the story of desegregation as it found it in 1959, five years after the Supreme Court ruling. The Commission tells of the fears (one, for example, was that scholastic standards would be lowered by integration) and the facts (which in some cases did and in others didn't bear out the fears). And it tells of the

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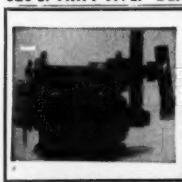

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few communities which complied with the ruling and the many that did not and will not for a long time to come. Even school systems willing to comply need time – several desegregation plans approved by lower courts will take from 10 to 12 years of "deliberate speed" to be carried out.

Such then are the five forces which molded the news and trends in American education last year. It is these which explain why U. S. and Soviet educators exchanged visits throughout the year; why there was a hue and cry against overtesting and undercounseling of American pupils; why Arlington Heights, Ill., and 74 other school systems, experimented with teacher aides; why people are reading Conant's latest book, *The State, The Parent and the Child;* and why the entire Price Edward County, Va., closed its public schools.

There will be more news of a similar stripe next year. The same five forces will be at work. ★

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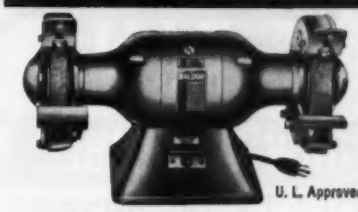

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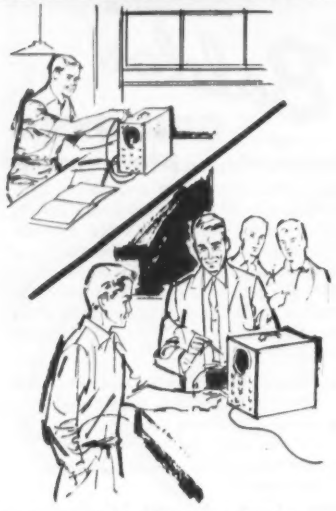

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from Washington

by Michael Paca

NDEA Gets Reinterpreted. – Labor is satisfied it has done all it could to change the federal regulations under which the area vocational-education programs are now to operate.

Labor is dissatisfied with the law itself. The next step, therefore, is to urge Congress to amend Title VIII of the National Defense Education Act, says the AFL-CIO.

Whether labor will be as successful with Congress (in getting what it wants) as it was with the U. S. Office of Education is the question which will be decided in 1960 or 1961. But meanwhile the metal and building-trades departments of the AFL-CIO feel pretty good about their success in changing the Federal Regulations and Suggestions for operating Title VIII of the NDEA.

As labor sees it, by revising the documents, the Office of Education "has taken a broader and more realistic view of the intent and purposes of Title VIII." From labor's point of view, the Office of Education "now recognizes that area vocational programs are not limited to technicians to the exclusion of apprentices and journeymen." To further clinch this point, the AFL-CIO wrote its state and local bodies in November: "State and local vocational-education authorities can and should set up programs [under Title VIII] designed for employed persons, including apprentices and journeymen."

The AFL-CIO metal and building-trades departments are asking members to keep a look-out for how things are going for journeymen and apprentices under the revised regulations. Labor officials in Washington are asking their local affiliates to report to their "appropriate national organizations" the experiences they encounter in trying to set up area programs for journeymen and apprentices. Says one communication mailed to thousands of AFL-CIO affiliates: "Any area programs for journeymen and apprentices which are requested but not approved should be reported in detail." Reports of such experiences presumably will be used as a basis for arguments that Congress should amend Title VIII to labor's liking.

What labor doesn't like first and foremost is that word "technician." None of the definitions and descriptions of a technician which have been offered in Washington during the past year please labor. The AFL-CIO still insists that "technician" has no accepted or common definition, that it is misleading and hazy. Labor wants it eliminated from the act, if and when it is amended. Also displeasing to labor is the present act's restriction of training to "occupations necessary to the national defense." Regulations passed at national, state, and local labor organizations have demanded amendments eliminating this restriction also. All skilled occupations should be eligible under Title VIII, labor will insist in any amendments proposed in Congress.

However, timing the proposed amendments presents a problem in strategy. It is not likely that Congress will rush to amend the National Defense Education Act bit by bit or at the request of a single group. Congress is more likely to wait until the Administration and organized educators, as well as labor, present a complete package of amendments. At this moment, the Administration is letting well enough alone. There is little chance that Secretary Flemming and his Department will ask for changes early in 1960. "We need another year of experience before we ask for major revisions of the act," one official said.

Saving Deaths. – It is no news that workers get killed and hurt on the job daily. And it is no consolation that the annual toll of injuries is considerably less than it was in the wildcat days of the 1920's. This year, some 16,000 to 17,000 persons will be killed at work; and close to 2,000,000 will be disabled – some totally or partially for life; others, temporarily.

American industry has suffered losses of this size for the past several years. There is no reason they will diminish during the next several years, despite the strong safety-education movement that has developed in the U. S. in recent years. In fact, it is because of the safety movement that

(*Continued on page* 47)

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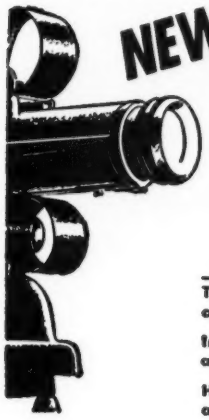

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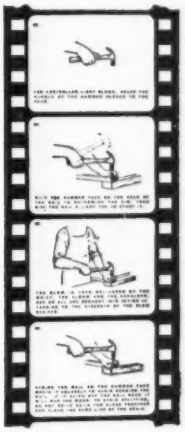

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